The City of Winnipeg

Water & Waste Department

Identification Standard

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1 INTRODUCTION

This Water and Waste Department Identification Standard is to be referenced for consistent and accurate identification for all process, mechanical, electrical, and automation equipment. The standard also provides guidance regarding architectural room identification and communication equipment. This document provides clear guidance to department personnel, as well as external consultants, regarding appropriate equipment identification. A consistent standard has been developed for all Water and Waste groups, including Collections, Land Drainage, and Solid Waste (as applicable), however it is acknowledged that some exceptions for various groups may be required due to special circumstances, or existing established precedent.

1.1 Scope of the Standard

This identification standard applies to all City-owned Water and Wastewater facilities, which includes the following facilities:

- The Water Treatment Plant
- Water pumping stations
- The Shoal Lake Intake facility
- Remote water facilities, including standpipes, valve chambers, boathouses, etc.
- Wastewater treatment facilities
- Wastewater lift stations
- Flood pumping stations
- Underpass sites
- Wastewater Diversion Stations
- Deep Well Locations
- Fountain Locations
- Land Drainage Facilities
- Current and future remote wastewater sites (outfalls, valve chambers, etc).

1.2 Application

Existing facilities do not necessarily comply with this standard. The expectations regarding application of this standard to existing facilities must be decided on a case-by-case basis, however general guidelines for application are presented as follows:

- All new facilities must comply completely with this standard.
- All major upgrades to a facility, or a larger facility's process area, must completely comply with this standard. Any existing equipment within the area being upgraded should be re-identified.
- All minor upgrades should utilize this standard as far as practical for new equipment, however in some cases compromise with the existing facility identification practice may be required. For example, if adding a single pump to the WEWPCC facility, it is recommended to identify the pump as S230-P, rather than P-S230.

1.2.1 Re-identification

When equipment is re-identified to this new standard, it is recommended that the following be implemented:

- All equipment lamacoids and labels are to be replaced with the new identifier.
- All drawings that are being modified as part of the work are to utilize the new identifier. Major drawings such as P&IDs and Single Line Diagrams should display both the new and the old identifiers, in the following format:

  New-Identifier
  (was Old-Identifier)

- Generate a master equipment list with the new identifier, old identifier, and equipment description.

2 GENERAL

2.1 General Identification Requirements

General identification requirements are as follows:

- Unambiguous Identity
  - All equipment identifiers shall be unique. No two pieces of equipment within the same facility are to share a common identifier.
- Consistency
  - The identification system is to be consistent across all facilities.
  - Prior to addition of a new identifier type, all new additions to the standard should be vetted by a group, to avoid inconsistent additions to the standard.
  - Spaces within identifiers are not permitted. For example, PNL M10 is not a substitute for PNL-M10.

Allowable characters in equipment identifiers are as follows:

- Uppercase letters A through Z
- Numerals 0 through 9
- Dash “-“ (or underscore “_” in software packages where dashes are not supported)
- Period “.”

No other symbols or characters or spaces shall be utilized in an identifier.

2.2 Facility Code

Each City of Winnipeg facility is assigned a unique, four-digit facility code. The facility code is to be used on drawings and documentation as required. The facility code appears within all City drawing numbers, but need not be shown within the content of the drawing. The facility code is deemed an optional component of equipment and instrument identifiers, with the preference to omit the facility code in order reduce the overall length of identifiers.

Systems such as a central Supervisory Control and Data Acquisition (SCADA) system that monitors multiple facilities are to make use of the facility code to segregate components by facility. The implementation of the facility code may be by means of a hierarchical directory system whereby individual components are stored under a folder that is named by the facility code. If the database or system where the identifier is being stored supports an additional field for the facility code, or is based upon a hierarchical system where the identifier can be placed as a component off of a root facility branch, it is deemed to be acceptable to omit the Facility Code in the instrument identifier. For example, the City's current Computerized Work Management System (CWMS) has an integral asset list, where a field is provided for the facility. In this case, the facility code for the equipment identifier would not be entered.

A complete list of facility codes is provided in Appendix A.

2.3 Process Area

The process area code identifies the physical area or building in which the equipment is located. A single letter character from A to Z represents a process area. Some specific recommendations regarding implementation and designation of process areas are:

- For new construction, ensure that process areas are allocated for a large enough area, such that the 26 available process area codes are not exhausted.
- The process area represents the physical location of the equipment, not the equipment function. For example, a hot water pump located in the P area is designated as having a P process area, not a B (Boilers) process area. This is much more straightforward for both assignment and maintenance personnel.
- For similar facilities, it is beneficial, but not mandatory, that similar process codes are utilized. For example, ideally the letter P should represent the Primary Clarifier process area at all wastewater treatment plants, but would represent something different for water facilities.

The following tables list the process areas for existing facilities.

Table 2-1 : Process Area Codes – Water Treatment Plant

Process Area	Description
A	Administration
B	Main Treatment Plant Building
C	Chemical Feed Systems
D	Deacon Booster Pumping Station
DC	Deacon Chemical Feed Building
E	Electrical Substation
F	Filtration
G	Standby Power Generation
H	Plant Utilities
I	Inlet Works and Raw Water Pumping
J	Hypochlorite Generation and Feed Building
K	Enclosed Bridge
L	Dewatering Cells (Freeze Thaw Pond)
M	General Plant Services / Miscellaneous (incl. Fire Pump Room and Electrical Room)
N	Aqueduct Bridges
O	Ozone
P	Flocculation and DAF
R	Residuals Handling
S	Bulk Chemical Storage and Feed Building
T	Treatment Water Storage (Clearwell)
U	Ultraviolet Light Disinfection
W	*Future*
X	Disinfection
Y	Yard Piping and Valve Chamber
Z	Forcemain

Note: The current application of process areas does not meet the intent of this standard, in that it is not based upon a physical location. For example, the H process area is for all plant utilities across the entire building.

Table 2-2 : Process Area Codes – Regional Water Pumping Stations

Process Area	Description
B	Collections Building – McPhillips
C	Chlorine Building – McPhillips
D	Deacon Booster Pumping Station Modifications
M	Main Pumping Station Building
R	Reservoir
Y	Yard Piping and Valve Chambers

Table 2-3 : Process Area Codes – Collections

Process Area	Description
A	General or process area is not applicable
F	Flood Pumping Stations
L	Wastewater Lift Stations
S	Sewer
U	Underpass Pumping Station

Table 2-4 : Process Area Codes – NEWPCC

Process Area	Description
A	General or process area is not applicable
B	Boilers
C	Centrate Treatment
D	Digesters
F	Phosphorous Removal Facility
G	Pre-Aeration and Grit Removal
M	Main Building
P	Primary Clarifiers
R	Oxygen Reactors
S	Secondary Clarifiers
U	UV Disinfection Facility
W	Sludge Dewatering

Table 2-5 : Process Area Codes – SEWPCC

Process Area	Description
A	General or process area is not applicable
B	Service Building, Boilers, Chemical Storage Building
G	Pump & Screen Building, Grit Building, Standby Generator Building
M	Administration Building and Septage Facility
P	Primary Clarifiers
R	Oxygen Reactors
S	Secondary Clarifiers
Z	UV Disinfection Facility (See Note 1)

Notes:

1. *Further discussion is required to determine if the appropriate UV Disinfection Facility process code for the future will remain as the letter Z.*

Table 2-6 : Process Area Codes – WEWPCC

Process Area	Description
F	Primary Sludge Fermenters
H	Headworks
L	General and Site Works
P	Primary Clarifiers
S	Secondary Clarifiers and BioReactors
T	DAF (Dissolved Air Flotation) Thickeners
U	Utility Building
V	(See Note 1)

Notes:

1. *Some equipment in the WEWPCC Utility Building has been re-identified as V. Further discussion is required to determine the appropriate process code.*

2.4 Functional Designations

The functional designation represents the function of the equipment. A complete list functional designations, for all disciplines, is shown in Appendix B.

It may be required to add new functional designations, where the existing list does not cover a new application. It is recommended that the following be reviewed prior to the addition of new designations:

- Functional designations are to be limited to a maximum of four characters.
- Utilize general, rather than specific, functional designations. For example, avoid specific pump designations such as:
    - CWSP Chilled Water Supply Pump
    - CHRP Chilled Water Return Pump
    - ELP Effluent Lift Pump
    - CFP Chemical Feed Pump
    - SLP Sludge Pump
- Update the master list in Appendix B, and ensure there is no overlap with other disciplines.
- It is acceptable to re-utilize an existing designation at an existing facility, even if is not listed in Appendix B, if it is deemed that there are too many existing documentation references to modify. In this case, the designation will be a unique special case, and is not to be added to Appendix B.
- Consider the use of the letter U to designate the equipment if the quantity of the equipment is low.

2.5 Equipment Number

2.5.1 Uniqueness

The equipment number is a number utilized to identify a specific instance of a piece of equipment within a certain process area. Equipment numbers may be re-used within different process areas.

Generally, equipment numbers should be unique for each piece of equipment, but equipment that is functionally related, and has a one-to-one relationship, may (but is not required to) share a common equipment number. The overall equipment identifier must still be unique. See Figure 2-1 for an example.

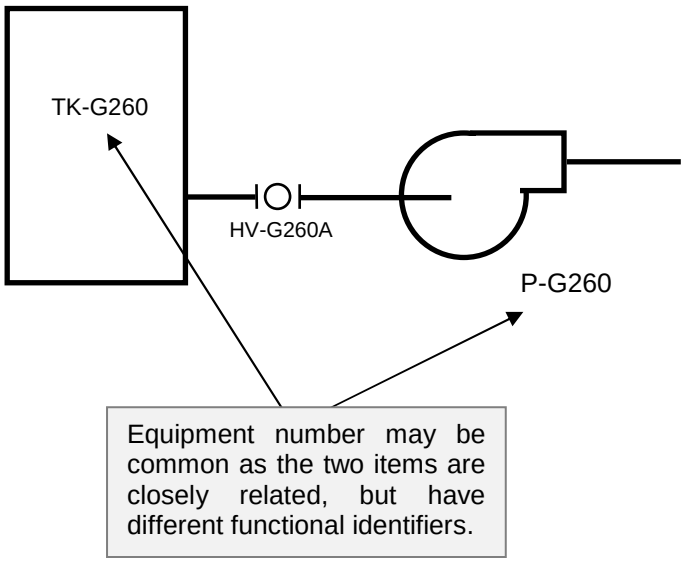


Figure 2-1: Equipment Number Example – Functionally Related

Note that electrical and mechanical equipment, that is not functionally related, must not share a common equipment number. For example, a MCC-M100, and a P-M100 should not existing within the same facility.

2.5.2 Number of Digits

Equipment numbers will typically have three digits in medium to large size facilities. However in small facilities, with less than 50 equipment identifiers, it is permissible to utilize two digit equipment numbers. Use of two digit equipment numbers will be typical for most Collections facilities, such as wastewater lift stations and flood pumping stations. Note that where two digit equipment numbers are utilized, the instrument loop number will also be shortened by a digit, to a total of three digits.

In some cases, for primary equipment such as major pumps, it shall be permissible to drop a leading zero. The purpose of dropping the leading zero is to ease the verbal pronunciation of the equipment identifier, for commonly referenced, major equipment. Examples are as follows:

P-M22 rather than P-M022 for MacLean Water Pump 22.

P-L1 rather than P-L01 for Marion Wastewater Lift Station Pump 1.

2.5.3 Equipment Number Ranges

For each facility, the equipment numbers are grouped and allocated in ranges to specific process functions. The range allocations are on a site by site basis, although efforts should be made to utilize common ranges for similar types of facilities.

Equipment number ranges are defined in Appendix C.

2.6 Subcomponents

In some cases, it is appropriate for equipment to be designated as a component of another identified piece of equipment, rather than an independent unit. Equipment subcomponents will typically be expressed as using a dot "." field, followed by the subcomponent identifier.

2.6.1 Subcomponent Identifier Format

E*	**.**	**SSSS**	**-**	**N**
Equipment Identifier		Subcomponent Functional Designation	-	Subcomponent Number

Where,

E* is the *Equipment Identifier*, of the base equipment, as designated in this document.

SSSS is the *Subcomponent Functional Designation*, which is one to four letters. Typical subcomponent designations are shown in other sections of this document.

N is the *Subcomponent Number*, an optional field to be utilized when there are multiple subcomponents within the base equipment.

Some examples of subcomponents are as follows:

- CMP-R521.LOP Lube oil pump for compressor CMP-R521.
- PNL-P712.MCB Panelboard PNL-P172 main breaker
- VFD-G612.RCTR-1 Line reactor for VFD-G612 (integrated in VFD enclosure)

In a full hierarchical system, almost every piece of equipment could potentially be viewed as a subcomponent or child of another system. For example, an agitator could potentially be viewed as a component of a tank. However, this approach would lead to an extensive hierarchical system that is not recommended for general plant identification. Thus, the following rules of thumb are presented as a guide for classification of an item as a subcomponent.

Identification of a device as a subcomponent should be considered when:

- The device is a constituent component that is physically enclosed in, or attached to, the larger equipment;
- The device is normally grouped as a component of the larger equipment when the equipment is purchased; and

- Operations personnel would normally refer to the device as a component of the larger equipment, rather than a separate device.

2.6.2 Use of Subcomponent System

It is deemed that there are numerous benefits to utilizing the subcomponent system, as indicated below:

- Due to the naming structure of subcomponents, it is clear as to what parent component the subcomponent belongs to.
- Subcomponents allow for smaller instrument bubbles to show functionality such as limit switches, without wasting drawing space. For devices such as large multi-turn actuators, with internal torque switches, hand switches, and limit switches, as well as many other types of equipment, this can be a significant savings in drawing space without any loss of identification capability.
- The use of subcomponents helps avoid the case where the subcomponent devices are placed on the equipment or instrument list, and confuse personnel because they cannot be found in the field. This is also particularly important to construction personnel, who must coordinate the purchase, storage, installation, and commissioning of these devices.
- The use of subcomponents aligns more closely with the current direction of control system software implementations, where the database and system model have hierarchical attributes, rather than a simple linear list of tags.

3 ARCHITECTURAL

3.1 Buildings

3.2 Room Identifier

Room Numbers will be identified as follows:

FFFF	**-**	**RM**	**-**	**P**	**-**	**L**	**RR**	**S**
Facility Code (Optional)	-	Room Designation	-	Process Area	-	Level	Room Number	Suffix (Optional)

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
RM	is the *Room Designation*, which is comprised of the letters RM.
P	is the *Process Area*, which is based on Section 2.3.
L	is the *Level*, which shall typically be one or two characters, as described in Section 3.2.1.
RR	is the *Room Number*, which shall typically be two digits, except as described in Section 3.2.1.
S	is the *Suffix*, which can be utilized to indicate room divisions as required.

Examples:

RM-S-115	Room 15 in the Secondary Clarifier process area, on the main level.
RM-M-222	Room 22 in the Main Building process area, on the second level.
RM-G-BA9	Room 9 in the Grit process area, lower level 2.

3.2.1 Building Level Designation

The building level designation shall be based upon Table 3-1 below.

Table 3-1 : Building Level Identifiers

Level	Description	Room Number Digits	Example
4	Fourth Floor	2	RM-M-405
3	Third Floor	2	RM-M-320
2	Second Floor	2	RM-M-251
1	Main / First Floor	2	RM-M-123
B	Lower Level 1 / Basement	2	RM-M-B52
BA	Lower Level 2	1	RM-M-BA5
BB	Lower Level 3	1	RM-M-BB1

Notes:

2. *Level 1 should be the uppermost floor entered at grade or at most, one half stair flight above.*
3. *Large mezzanines shall be numbered as a whole floor. Example: When a mezzanine exists between the first floor and the next whole floor, it will be numbered as the second floor.*
4. *Usable attic floors and penthouse levels should be numbered as if they are whole floors. For example, a two-story penthouse atop a three floor building will be numbered as the fourth and fifth floors. Do not use prefixes such as "R" for roof level.*

3.2.2 Drawing Representation

Room numbers on drawings may be presented as shown in Figure 3-1. Note that the room designation "RM" may be omitted on drawings, when used with the ellipse symbol.

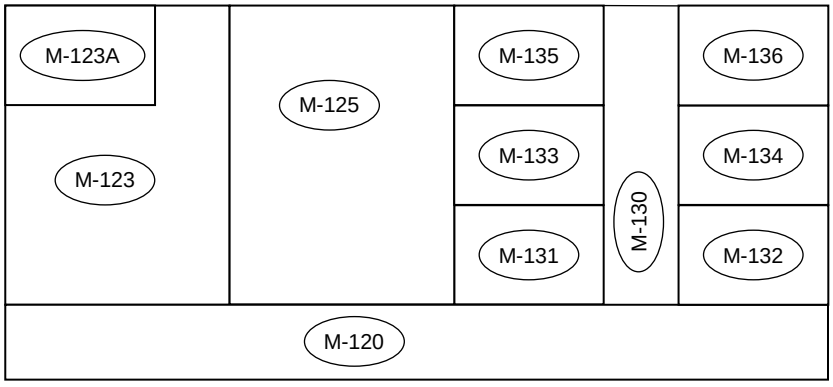


Figure 3-1 : Room Numbering on Drawings – Plan View

3.2.3 Room Numbering Guidelines

Utilize the following as a guide for room numbering:

- Numbers should flow from one end of the building to the other.
- Where corridors are present, use odd numbers on one side of a corridor and even numbers on the other side.
- Skip numbers as required to maintain succession of room numbering
    - In some instances, room numbers on one side of a corridor shall be skipped in order to maintain succession with the room numbers on the opposite side of the corridor. This may occur, for example, when a suite of rooms or large space is accessed through a single door and there are no other doors on that same side until further down the corridor. This will allow for future renovations that may convert suites or large spaces into separate or small rooms with a corridor door.
- Use alphabetic suffixes for small rooms entered from other rooms
    - For example, a small storage space off of room M-123 could be designated as M-123A.
- Provide all accessible spaces with room numbers.
    - In addition to rooms, all interior spaces that can be directly accessed, such as corridors, vestibules, stairwells, elevator shafts, and accessible pipe spaces shall be numbered in a manner as consistent as possible with standard room spaces. Where doors or walls separate different areas of these spaces, each area shall receive its own unique number.
- Identify stairwells with a single room identifier, with the main floor as the level. If the stairwell is not accessible from the main floor, utilize the access level closest to the main floor as room level designation. See Figure 3-2 for examples.

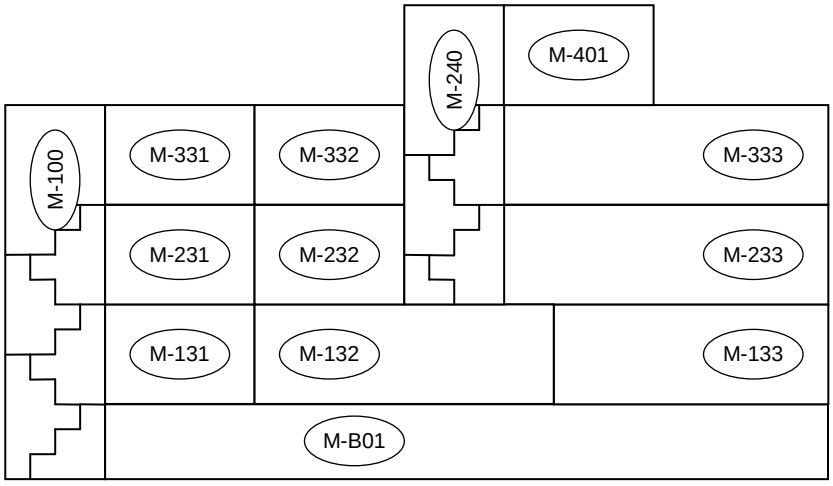


Figure 3-2 : Stairwell Identification Examples – Elevation View

- Rooms that span multiple levels should be identified with a level corresponding to the primary access level. See Figure 3-2 for examples of multi-level room identification.

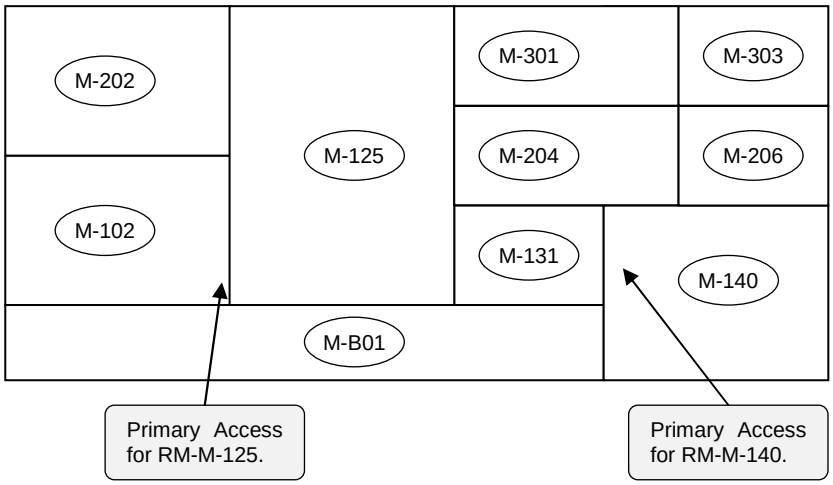


Figure 3-3 : Multi-Level Room Examples – Elevation View

4 MECHANICAL / PROCESS EQUIPMENT

4.1 Identifier Format

Mechanical / process equipment will be identified as follows:

FFFF	**-**	**EEEE**	**-**	**P**	**NNN**
Facility Code (Optional)	-	Equipment Functional Designation	-	Process Area	Equipment Number

Where,

FFFF is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.

EEEE is the *Equipment Functional Designation*, which is comprised of 2 to 4 characters from Section 4.2.

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the associated equipment. This will be three digits for medium to larger facilities, but will be two digits for smaller facilities, such as Collections facilities. Leading zeros may be dropped for major process equipment.

Examples:

CMP-G201 A compressor in the G process area.

P-M645 A glycol pump in the M process area.

R-R102 An oxygen reactor in the R process area.

SF-F61 A supply fan in a flood station. Note the two digit equipment number for Collections facilities.

P-L1 The first lift pump in a wastewater lift station. Note that the leading zero is dropped from the two digit equipment number.

4.2 Functional Designations

The functional designation represents the function of the equipment. A complete list functional designations is shown in Table 4-1.

Table 4-1 : Process / Mechanical Equipment Functional Designations

Functional Designation	Description	Notes
AD	Air Dryer	
AF	Aeration Fan	
AG	Agitator	
AHU	Air Handling Unit	Includes make-up air unit.
B	Blower	
BD	Balance Damper	See Section 4.3.
BFP	Back Flow Preventer	
BLR	Boiler	
BS	Bar Screen	
CC	Cooling Coil	
CDR	Condenser	
CE	Centrifuge	
CHLR	Chiller	
CL	Clarifier	Includes Primary and Secondary Clarifiers
CM	Clarifier Mechanism	
CMP	Compressor	
CNV	Conveyor	Includes skimmers
CRN	Crane	
CT	Cooling Tower	
CU	Condensing Unit	
CV	Check Valve	See Section 5.2
EF	Exhaust Fan	
F	Fan - General	
FA	Flame Arrestor	
FC	Fan Coil	
FD	Fire Damper	Utilize same equipment number as air handler.
FDR	Feeder	Examples screw feeder, chlorinator, glycol make-up unit
FEX	Fire Extinguisher	
FG	Flap Gate	
FIL	Filter	
GR	Grille – General	See Section 4.3.
GRD	Grille – Diffuser	

Functional Designation	Description	Notes
H	Heater	General Heaters, Radiant Heaters, etc.
HB	Heater - Baseboard	
HC	Heating Coil	
HCE	Heating Coil, Electric	
HRC	Heat Recovery Coil	
HE	Heat Exchanger	
HO	Hoist	
HOP	Hopper	
HP	Heat Pump	
HRC	Heat Recovery Coil	
HV	Hand/Manual Valve	See Section 5.2
MXR	Mixer	
OD	Overhead Door	
P	Pump	
R	Reactor (various processes)	
RES	Reservoir	Large water containment structure.
S	Skid Package	
SA	Sampler	
SCBR	Scrubber	
SF	Supply Fan	
SL	Stop Logs	
SLG	Sluice Gate	
STR	Strainer	See Section 5.2
TK	Tank	
TU	Terminal Unit (HVAC)	Includes CAV/VAV/Dual Duct boxes. Dampers are to be identified as per Section 7.1 – Instrumentation.
U	Miscellaneous Equipment Not In List	e.g. water softener
UH	Unit Heater	
UVR	Ultra-Violet (UV) Reactor	
V	Vessel, Pressure Vessel	e.g. air receiver, glycol expansion tank
W	Weir	
WGB	Waste Gas Burner	

Notes:

1. *Equipment Functional Designations are to be unique, including electrical, automation, communication, and security equipment. Instrument Functional Designations may overlap Equipment Functional Designations.*
2. *See Appendix B for a master list of Equipment Functional Designations.*

4.3 HVAC Miscellaneous Components

Miscellaneous HVAC components will be identified as follows:

FFFF	**-**	**EEEE**	**-**	**P**	**NNN**	**-**	**XX**
Facility Code (Optional)	-	Equipment Functional Designation	-	Process Area	Equipment Number	-	Component Number

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
EEEE	is the *Equipment Functional Designation*, which is comprised of 2 to 4 characters from Section 4.2.
P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number* of the associated equipment. Where an equipment number is not associated, allocate an equipment number.
XX	is the *Component Number*, which can be one or two digits, and will increment starting at 1.

Examples:

FD-G601-5	the fifth fire damper associated with air handling unit AHU-G601.
GD-M645-1	The first diffuser grille associated with SF-M645.
GR-P682-22	The 22nd grille associated with SF-P682.

4.4 Subcomponents

The following designations are to be utilized for mechanical equipment subcomponents. See Section 2.6 for general rules on application of subcomponents.

Table 4-2 : Mechanical Equipment Subcomponents

Subcomponent Designation	Description	Notes
CMP	Compressor	e.g. component of a chiller.
F	Fan	
LOP	Lube Oil Pump	
MTR	Motor	
SWP	Swash Plate	
VSD	Variable Speed Drive	

Examples:

P-G261.MTR	The motor associated with P-G261.
CMP-M502.LOP	The lube oil pump associated with compressor CMP-M502.
CHLR-M621.CMP-1	Compressor 1 of chiller CHLR-M621.

5 PIPING

5.1 Pipe Designation

The identification format for piping is as follows.

P	**-**	**CCC**	**-**	**MMNN**	**-**	**LLLL**
Pipe Nominal Size	-	Fluid Commodity Code	-	Pipe Specification Code	-	Line Number (Optional)

Where,

P is the nominal pipe size in metric millimetres, and may be from 1 to 4 digits. See Table 5-1.

CCC is the *Fluid Commodity Code*, which is 2 to 4 characters from Section 5.1.2.

MMNN is the *Pipe Specification Code*, where MM is the material, and NN is a number referencing the specific specification. See Notes 1 and 2.

LLLL is the optional *Line Number*. The *Line Number* must be unique across the entire facility, for each *Fluid Commodity Code*. See Note 3.

Note:

1. *It is recommended that a common set of pipe specifications be developed for each type of facility.*
2. *For existing facilities, where the exact pipe specification is not known, the Pipe Specification Code may be omitted.*
3. *It is not expected that Line Numbers will be utilized on all projects. Coordinate with the City project manager for specific requirements regarding the applicability of Line Numbers.*
4. *The Fluid Commodity Code together with the Line Number must be unique across the facility, where Line Numbers are utilized.*

Examples:

150-PW-CS11	A 150mm (6”) potable water pipe, with specification code CS11. No line numbers utilized.
600-RAS	A 600mm (24”) Return Activated Sludge pipe, with an unknown pipe specification and no line number.
25-CLG-SS31-1151	A 25mm (1”) chlorine gas pipe, with pipe specification SS31, and line number 1151.
400-RW-CS52-1151	A 25mm (1”) chlorine gas pipe, with pipe specification SS31, and line number 1151. Note that this could be in the same facility as piping 25-CLG-SS31-1151.

5.1.1 Nominal Pipe Sizes

Table 5-1 : Nominal Pipe Sizes (Metric)

mm	Inches	mm	Inches	mm	Inches	mm	Inches
3	1/8	**75**	3	**275**	11	**750**	30
6	¼	**90**	3 ½	**300**	12	**800**	32
10	3/8	**100**	4	**350**	14	**850**	34
12	½	**112**	4 ½	**400**	16	**900**	36
20	¾	**125**	5	**450**	18	**950**	38
25	1	**150**	6	**500**	20	**1000**	40
32	1 ¼	**175**	7	**550**	22	**1100**	44
38	1 ½	**200**	8	**600**	24	**1200**	48
50	2	**225**	9	**650**	26	**1300**	52
65	2 ½	**250**	10	**700**	28	**1400**	56

5.1.2 Fluid Commodity Codes

Table 5-2 : Fluid Commodity Code Designations

Code	Commodity - Water	Commodity - Wastewater
AA	Aqua Ammonia	
AHP	Air, High Pressure	
ALP	Air, Low Pressure	Air, Low Pressure
AS	Air Scour	
BWS	Backwash Supply	
BWW	Backwash Wastewater	
CA	Compressed Air	Compressed Air
CCW	Circulating Cooling Water	
CDR	Condenser Water Return	Condenser Water Return
CDS	Condenser Water Supply	Condenser Water Supply
CDW		Cold Domestic Water
CE		Centrate
CG		Calibration Gas
CHR	Chilled Water Return	Chilled Water Return
CHS	Chilled Water Supply	Chilled Water Supply
CL2	Chlorine	Chlorine
CLG	Chlorine Gas	
CLS	Chlorine Solution	
CO2	Carbon Dioxide	Carbon Dioxide
CON		Condensate
CRW	Clarified Discharge Water	Sludge Cake
CS	Caustic (Sodium Hydroxide)	
CWR	Cooling Water Return	Cooling Water Return
CWS	Cooling Water Supply	Cooling Water Supply
D	Drain	Drain
DD	Deacon Effluent (Post UV)	
DDW	Demineralized Water	
DEA	Dilute Acid	
DEC	Dilute Caustic	
DF	DAF Float	
DG		Digester Gas
DGH		Digester Gas, High Pressure
DFR	Diesel Fuel Return	
DFS	Diesel Fuel Supply	
DHW	Domestic Hot Water	

Code	Commodity - Water	Commodity - Wastewater
DL		Decant Liquor
DP		Dry Polymer
DRA	Drainage (Floors)	
DRN	Drains (Clean Drains)	
DRS	Subdrain	
DS	Deacon Suction	Digester Sludge
DSW	Distilled Water	
DU	Deacon UV (Pre UV)	
EE	Engine Exhaust	
ES	Electric Supply	Electric Supply
EXP	Expansion Tank Equalizer Line	
FC	Ferric Chloride	Ferric Chloride
FE		Final Effluent
FED	Filter Media Eduction	
FIN	Filter Influent	
FIR	Firewater	
FOA		Foul Air
FOR	Fuel Oil Return	
FOS	Fuel Oil Supply	
FOV	Fuel Oil Vent	
FPW	Fire Protection Water	
FSL		Fermenter Sludge
FSU		Fermenter Supernatant
FSW		Flushing Water
FTR	Filter To Recycle	
FW	Filtered Water	
GE		Grit Effluent
GOX	Gaseous Oxygen	
GR	Glycol Return	Glycol Return
GS	Glycol Supply	Glycol Supply
HCO	Hydraulic Oil	Hydraulic Oil
HDW		Hot Domestic Water
HFS	Hydrofluosilicic Acid	
HFW		Hot Flushing Water
HP	Hydrogen Peroxide	
HPS	High Pressure Steam	
HR	High Pressure Condensate	
HST	12% Hypochlorite Solution	

Code	Commodity - Water	Commodity - Wastewater
HWS		Hot Water Supply
HWR		Hot Water Return
HYD		Hydrogen
HYP	0.8% Hypochlorite Solution	
IAS	Instrument Air Supply	Instrument Air Supply
LCP		Liquid Concentrated Polymer
LGO	Lubricating Oil	Lubricating Oil
LOX	Liquid Oxygen	
LPC	Low Pressure Condensate	
LPS	Low Pressure Steam	Low Pressure Steam
LT	Level Transmitter Sleeve Embed	
MET		Methanol
ML		Mixed Liquor
MP		Mixed Polymer
MPC	Medium Pressure Condensate	
MPS	Medium Pressure Steam	
MU	Make-Up Water	
N2		Nitrogen
NG	Natural Gas	Natural Gas
O2		Oxygen
OF	Overflow	
OZG	Ozone Off Gas	
OZO	Ozonated Oxygen	
OZW	Ozonated Water	
P	Propane	
PC	Pumped Condensate	
PD		Process Drain
PE		Primary Effluent
PEF	Phosphate Feed	
PLD	Dry Polymer	
PLS	Polymer Solution	
PO		Process Overflow
PS		Primary Sludge
PSW	Plant Service Water	
PV		Process Vent
PW	Potable Water	Potable Water
R	Refrigerant	Refrigerant
RAS		Return Activated Sludge

Code	Commodity - Water	Commodity - Wastewater
RD	Roof Drain	
RS		Raw Sewage
RW	Raw Water	
RWL	Raw Water Leader	
SA		Soda Ash
SAM	Sample	
SAN	Sanitary Drainage	
SBS	Sodium Bisulphite	
SC		Scum
SCA	Sulphuric Acid	
SDR	Saturated Recycle Water	
SE		Secondary Effluent
SEA		Service Air
SHC	Sodium Hypochlorite	
SLO	Seal Oil	
SLU	Sludge	
SP	Sprinkler Pipe	
STD	Salt Dry	
SUB		DAF Subnatant
SUP	Supernatant	
SW	Seal Water	Seal Water
SWD	Stormwater Drainage	
TBS		Thickened Bottom Sludge
TCE		Treated Centrate
TDW	Tempered Domestic Water	
TO		Thermal Oxidizer
TRW	Treated Water	
TS		Thin Sludge
TW	Tempered Water	
TWAS		Thickened Waste Activated Sludge
VAC	Vacuum	Vacuum
VTA	Vent To Atmosphere	Vent to Atmosphere
W		Water
WA		Waste Air
WAS		Waste Activated Sludge
WS	Softened Water	

5.1.3 Piping Material

Table 5-3 : Piping Material

Designation	Description
AA	Aluminum Alloy
BA	Aluminum Bronze
CG	Galvanized Carbon Steel
CS	Carbon Steel
DI	Ductile Iron
KB	Concrete
PA	ABS (Acrylonitrile-butadiene styrene)
PD	HDPE ((High Density Polyethylene)
PP	PP (Polypropylene)
PV	PVC (Polyvinyl Chloride)
SS	Stainless Steel

5.2 Piping Components

5.2.1 Manual Valve Identifier Format – No Instrumentation

The identification format for manual valves, without instrumentation, is as follows.

FFFF	**-**	**HV**	**-**	**P**	**NNN**	**S**
Facility Code (Optional)	-	Manual Valve Designation	-	Process Area	Equipment Number	Suffix

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
HV	is the Manual Valve Designation.
P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number* of the associated equipment.
S	is the *Suffix*, a single letter to designate the specific valve.

Notes:

1. *The Equipment Number will typically be the nearest associated equipment. In some cases, Equipment Numbers may be designated for allocation of manual valves.*
2. *Manual valves, check valves, and strainers may utilize common equipment numbers and suffixes. For example, it is acceptable to have a HV-G638A and a CV-G638A.*
3. *Controlled valves will be identified via the instrumentation standard identified in Section 7.1.*

Examples:

HV-G201A	A manual valve in the G process area, associated with pump P-G201.
HV-M645B	A manual valve in the M process area.
HV-R102A	A manual valve in the R process area.

5.2.2 Manual Valve Identifier Format – With Instrumentation

The identification format for manual valves, with instrumentation, is based upon the instrumentation standard identified in Section 7.1. The format of the identifier is as follows.

<table>
<tr><th>FFFF</th><th>-</th><th>HV</th><th>-</th><th>P</th><th>NNN</th><th>T</th></tr>
<tr><td rowspan="2">Facility Code (Optional)</td><td rowspan="2">-</td><td rowspan="2">Manual Valve Designation</td><td rowspan="2">-</td><td rowspan="2">Process Area</td><td>Equipment Number</td><td>Instrument Number</td></tr>
<tr><td colspan="2">Loop Number</td></tr>
</table>

Where,

FFFF is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.

HV is the Manual Valve Designation.

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the associated equipment. If no equipment is associated, allocate *Equipment Numbers* specific for the applicable valve.

T is the *Instrument Number*, where the number increments from the number 1 through 9. Use of the number 0 should be infrequent, except for special instruments, or those where the instrument ending with 0 is a common instrument that serves other instruments.

NNNT is the Loop Number, comprised of the *Equipment Number* together with the *Instrument Number*.

Notes:

1. The Equipment Number will typically be the nearest associated equipment. In some cases, Equipment Numbers may be designated for allocation of manual valves.

Examples:

HV-G2011 A manual valve in the G process area, associated with pump P-G201, and contains open and closed limit switches.

HV-M6451 A manual valve in the M process area, with a position transmitter.

HV-R1022 A manual valve in the R process area, with a limit switch.

5.2.3 Check Valve and Strainer Identifier Format

Check valves and strainers, with no instrumentation, are to be identified as follows:

FFFF	**-**	**EEE**	**-**	**P**	**NNN**	**S**
Facility Code (Optional)	-	Equipment Functional Designation	-	Process Area	Equipment Number	Suffix

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
EEE	is the *Equipment Functional Designation*, which is comprised of 2 to 4 characters from Section 4.2. Specifically in this case, CV for Check Valve or STR for strainer.
P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number* of the associated equipment.
S	is the *Suffix*, a single letter to designate the specific valve.

Notes:

1. *The Equipment Number will typically be the nearest associated equipment. In some cases, Equipment Numbers may be designated for allocation of manual valves.*
2. *Manual valves, check valves, and strainers may utilize common equipment numbers and suffixes. For example, it is acceptable to have a HV-G638A and a CV-G638A.*
3. *Controlled valves will be identified via the instrumentation standard identified in Section 7.1.*

Examples:

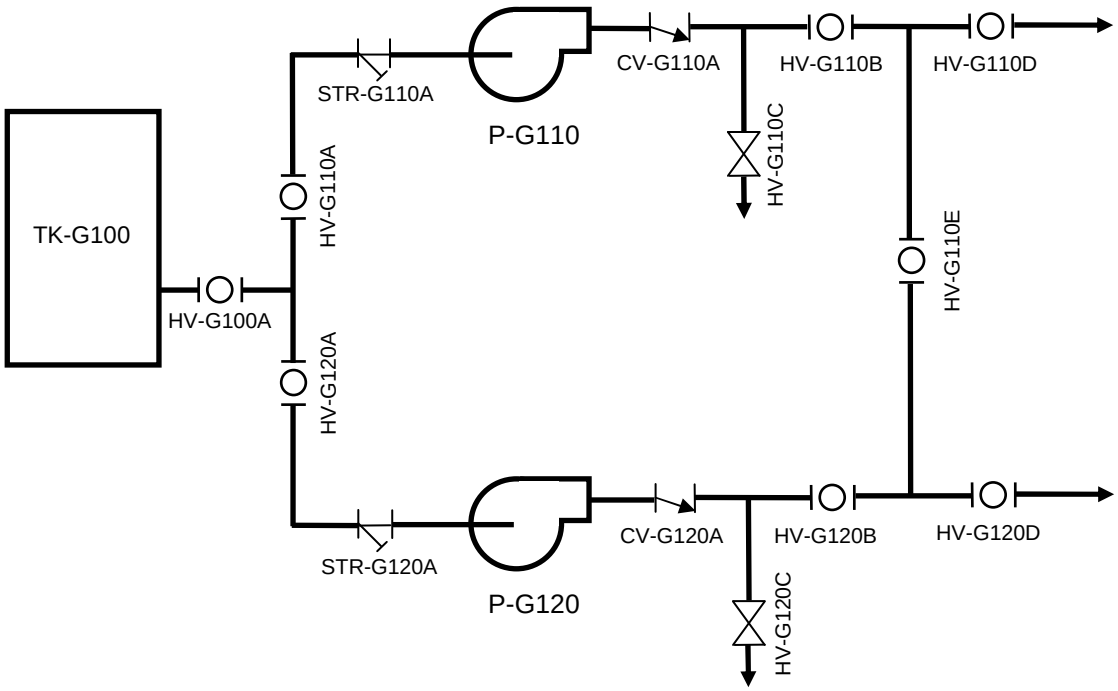
CV-G201A	A check valve in the G process area, associated with pump P-G201.
CV-M645B	A check valve in the M process area.
STR-R102A	A strainer in the R process area.

5.2.4 Cathodic Protection Components

The identification of cathodic protection system elements is to be developed.

5.2.5 Sample P&ID

See Figure 5-1 for a sample P&ID segment depicting the identification of manual valves, check valves, and strainers.



Note: All devices above have an implied prefix of 0102- (or similar)

Figure 5-1 : Sample P&ID – Manual Valve, Strainer, and Check Valve Indication

6 ELECTRICAL

6.1 Equipment Identifier Format

The identification format for electrical equipment is as follows.

FFFF	**-**	**EEEE**	**-**	**P**	**NNN**	**T**	**-**	**S**
Facility Code (Optional)	-	Equipment Functional Designation	-	Process Area	Equipment Number	Type Modifier (Optional)	-	Suffix (Optional)

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
EEEE	is the *Equipment Functional Designation*, which is comprised of 2 to 4 characters from Section 6.2.
P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number*. Select numbers consistent with the ranges in Appendix C.
T	is the Type Modifier, an optional field that is utilized to designate essential or UPS powered equipment. See Section 6.3.
S	is the Suffix, an optional numeric or letter code to distinguish between multiple pieces of equipment with a common equipment number. Generally, numbers are utilized for equipment in series, and letters for equipment in parallel.

Examples:

0101-MCC-M01	A MCC located in the M process area of the NEWPCC facility. Note that a leading 0 is dropped.
DS-G510	A disconnect switch for pump P-G510.
CB-M23-B	The second (alternate) breaker feeding PNL-M23. Note that a leading 0 is dropped.
PNL-S25E	Essential power panelboard located in the S process area. Note that a leading 0 is dropped.
XFMR-H711	Transformer within a regional water pumping station.
MCC-L71	MCC within a wastewater lift station (Note the two digit equipment number)

6.2 Electrical Functional Designations

Table 6-1 : Electrical Equipment Functional Designations

Functional Designation	Description	Notes
ATS	Automatic Transfer Switch	
BAT	Battery	
BC	Battery Charger	
BWY	Busway	
C	Cable (Power)	
CAP	Capacitor	Typically individual unit. See PFC.
CB	Circuit Breaker	Includes air, vacuum, SF6, and moulded case circuit breakers
CBUS	Cable Bus	
CON	Contactor	
CP	Control Panel	
CPR	Cathodic Protection Rectifier	
DP	Distribution Panel	Typically 600V panel, for distributing power to other points of the electrical distribution system.
DS	Disconnect Switch (non-fusible)	
FAAP	Fire Alarm Annunciator Panel	
FACP	Fire Alarm Control Panel	
FAS	Fire Alarm System	
FDS	Fusible Disconnect Switch	
FU	Fuse	
GEN	Generator	
HCP	Heater Contactor / Control Panel	
HF	Harmonic Filter	
JB	Junction Box	
K	Interlocking Key (Kirk Key)	See Section 6.4.4
MCC	Motor Control Centre	
MCP	Motor Circuit Protector	
MCS	Moulded Case Switch	
MMS	Manual Motor Starter	
MS	Motor Starter	
MSP	Motor Starter Panel	
MTR	Motor	
MTS	Manual Transfer Switch	

NGR	Neutral Grounding Resistor	
PB	Pull Box	
PFC	Power Factor Correction Unit	
PM	Power Meter	
PNL	Panelboard	
PS	Power Supply	24VDC power supply, or fire alarm booster power supply.
RCPT	Receptacle	
RCTR	Reactor	Includes VFD line and load reactors.
SCR	Silicon Controlled Rectifier	
SGR	Switchgear	
SPL	Splitter	
SS	Soft Starter	
SW	Switch	
TVSS	Transient Voltage Surge Suppressor	
UPS	Uninterruptible Power Supply	
VFD	Variable Frequency Drive	
XFMR	Transformer	

6.3 Type Modifier

Electrical equipment that is deemed critical to the operation of a facility is typically backed up by one or more generators or some form of uninterruptible power supply. Electrical equipment of this nature is to be identified with a type modifier to provide indication that the equipment is critical in nature.

The following type modifiers will be used on electrical equipment based on the type of backup power system it is supplied by:

Type Modifier	Description
E	Essential – Distribution is deemed to be of higher criticality and is typically backed up by a generator, or at minimal has a transfer switch between multiple sources.
U	Uninterruptible – The distribution equipment is powered by a UPS

Notes:

1. *The Type Modifier is utilized only for essential and uninterruptible power systems.*
2. *The Type Modifier is not to be used on generators or UPS units as these devices are the sources of the backup power supply.*

6.4 Device-Specific Identifier Formats

6.4.1 Cables Associated with Identified Equipment

The identification format for power cables is as follows.

C	**-**	**P**	**NNN**	**-**	**S**
Cable Designation	-	Process Area	Equipment Number of Load	-	Suffix (Optional)

Where,

C is the Cable Designation. For power cables, the letter C is utilized. For busway, BSY is utilized.

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the load equipment.

S is the *Suffix* utilized to identify the specific cable associated with the equipment. The Suffix is not required if a single cable is associated with the equipment. Utilize sequential numbers for cables in series, or for different purposes, and letters for cables in parallel. Utilize the letter T to designate tie connections.

Notes:

1. In the event the cable does not serve a specific load, such as a tie cable between two MCCs, select one of the two units of equipment as the prime equipment number for the cable.

Examples:

C-G683-1 The feeder for a motor disconnect, DS-G683.

C-G683-2 The motor cable feeding exhaust fan EF-G683, and fed from disconnect switch DS-G683.

C-M02 The feeder for MCC-M02

C-M03-A The normal power feeder to ATS-M03.

C-M03-B The emergency power feeder to ATS-M03.

C-M01-T A cable used as a tie between MCC-M01 and DP-M02.

C-L1 Cable feeding Lift Pump P-L1 in a wastewater lift station.

6.4.2 General Purpose Cables – Lighting & Receptacles

The identification format for general purpose cables, for single phase loads, is as follows.

C	**-**	**P**	**NNN**	**-**	**KK**	**S**
Cable Designation	-	Process Area	Equipment Number of Source Panel	-	Circuit Number	Switched Sub-Circuit (Optional)

Note:

1. It is expected that three-phase loads will all have equipment numbers assigned.

Examples:

C-S22-14 Circuit 14 of PNL-S22.

C-S22-14A Switched sub-circuit of circuit 14, fed from PNL-S22.

6.4.3 Junction Boxes - Power

The identification format for power junction boxes is as follows.

JB	**-**	**P**	**NNN**	**T**	**-**	**S**
Junction Box Designation	-	Process Area	Equipment Number	Circuit Number	-	Suffix (Optional)

Where,

JB	is the Junction Box designation.
P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number* of the load equipment. If not associated with a specific piece of equipment, use an *Equipment Number* in the electrical equipment range, accordance with the *Equipment Number* ranges in Appendix C.
T	is the *Type Modifier*, optional to electrical equipment as per Section XX.
S	is the *Suffix* utilized to identify multiple junction boxes associated with an equipment number.

Examples:

JB-U421	Junction box associated with pump P-U421.
JB-C01	Junction box associated with MCC-C01.
JB-R60	Junction Box associated with numerous pieces of equipment, within a wastewater treatment facility.
JB-M751	Junction Box associated with numerous pieces of equipment, within a regional water pumping station.

6.4.4 Interlock Keys

The identification format for interlock (Kirk) keys is as follows.

K	**-**	**P**	**NNN**
Interlocking Key Designation	-	Process Area	Equipment Number

Where,

K is the *Interlocking Key* designation.

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the associated equipment. Where multiple pieces of equipment utilize a common interlock key system, select the primary equipment number as the equipment number for all interlock keys associated with the system.

Note:

1. The interlock key identifier will be the same for all interlocks associated with the system. Thus, for a system with four breakers interlocked with four locks and three keys, all four interlocks and keys have the same identifier.

Example:

K-M701 Interlock key system associated with MCC-M701.

6.4.5 Wire Tags

6.4.5.1 Lighting and Receptacle Circuits - AC

The identification format for lighting and receptacle circuits is as follows.

P	NNN	-	C	S
Process Area	Equipment Number of Source	-	Circuit Number or Neutral Designation	Switched Sub-Circuit (Optional)

Where,

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the source panelboard.

C is the *Circuit Number* of the source panelboard, or N for a neutral wire.

S is the *Switched Sub-Circuit Designation*, and is an incrementing letter for a conductor that is switched.

Note: The Equipment Functional Designation, typically PNL, is implied to reduce the length of the wire tags.

Examples:

G701-32 Line (Hot) conductor of circuit 32, associated with PNL-G701.

W752-N Neutral conductor associated with PNL-W752.

S702-12B The second switched sub-circuit line (hot) conductor, associated with PNL-S702 circuit 12.

6.4.5.2 DC Power Circuits

DC power circuits, such as from large switchgear DC power supply units require unique identification as follows:

P	NNN	-	C	S	D
Process Area	Equipment Number of Source	-	Circuit Number or Neutral Designation	Switched Sub-Circuit (Optional)	Power Designation

Where,

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the source panelboard.

C is the *Circuit Number* of the source panelboard, or N for a neutral wire.

S is the *Switched Sub-Circuit Designation*, and is an incrementing letter for a conductor that is switched.

D is the *Power Designation*, which is based on Table 6-2.

Note: The Equipment Functional Designation, typically PNL, is implied to reduce the length of the wire tags.

Table 6-2 : DC Power Circuit Wire Tag Power Designations

Power Designation	Description
C	DC Common (0V)
G	Ground
+	DC Positive
-	DC Negative

Note: The Ground designation is not typically required, provided that the ground wire is green.

Examples:

G751-22+ Positive wire of circuit 22, fed from PNL-G751.

G751-22- Negative wire of circuit 22, fed from PNL-G751.

G751-22A+ Positive wire of switched circuit 22, fed from PNL-G751.

6.4.5.3 Three Phase Power Wiring

The identification format for three phase power wire tags is as follows.

P	**NNN**	**-**	**X**	**H**
Process Area	Equipment Number	-	Sequence Number (Optional)	Phase

Where,

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the load equipment. If not associated with a specific piece of equipment, use of *Equipment Number* in the electrical range is preferred, in accordance with the *Equipment Number* ranges in Appendix C.

X is an optional *Sequence Number* that is typically a numeric character, utilized when there are multiple power cables associated with an *Equipment Number*.

H is the *Phase*, and should be labelled A, B, C, or N.

Three phase power wiring wire tagging is required, except where the conductors are color coding, are in a dedicated cable or conduit, and the routing is obvious.

Examples:

G681-A Phase A conductor of a power cable associated with EF-G681. The wire is in common conduit with other power cables.

W151-2B Phase B conductor of the second power circuit associated with centrifuge CE-W151.

\- No wire tags are needed for the conductors of a pump, fed via a Teck power cable, where the conductors are color coded and the overall cable is identified and labelled.

6.4.5.4 Motor Control Circuits

The identification format for motor control circuits is as follows:

P	**NNN**	**-**	**WWW**	**S**
Process Area (Optional)	Equipment Number (Optional)	-	Wire Number	Suffix (Optional)

Where,

P — is the *Process Area*, which is based on Section 2.3. It is not required for wires exclusively within the motor starter.

NNN — is the *Equipment Number* of the associated equipment. It is not required for wires exclusively within the motor starter.

WWW — is the *Wire Number*, an incrementing number.

S — is an optional *Suffix*, and is utilized where it is desired to utilize the same wire number, but the signal has changed.

Notes:

1. *It is desirable, but not mandatory, that the wire number in a motor starter match the terminal number.*
2. *It is deemed acceptable to omit the Process Area and Equipment Number for wires exclusively within the motor starter, as it is common industry practice, and MCC manufacturers only typically provide numeric wire numbers.*

Examples:

8 — Control wire 8 located in the motor starter for AHU-G652, and lands on terminal 8 in the motor starter.

8A — Control wire 8A located in the motor starter for AHU-G652, which does not land on a terminal strip.

G652-8 — Control wire 8, located in external field wiring, associated with AHU-G652.

6.4.6 Tie Circuit Breakers

Tie breakers are used to connect electrical buses together. The complete identifiers for electrical ties are to be slightly different in order to provide clarification of which buses are connected when the tie is closed.

The identification format for electrical equipment is as follows.

FFFF	**-**	**EEEE**	**-**	**P**	**NNN**	**-**	**T**	**-**	**S**
Facility Code (Optional)	-	Equipment Functional Designation	-	Process Area	Equipment Number	-	Tie Designation	-	Suffix (Optional)

Where,

FFFF is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.

EEEE is the *Equipment Functional Designation*, which is comprised of 2 to 4 characters from Section 6.2. Typically, this is CB for circuit breaker, but could be DS for disconnect switch.

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number*. Select the equipment number of the bus that the tie breaker is more closely associated with.

T is the *Tie Designation*, which is always the single letter T.

S is the Suffix, an optional numeric or letter code to distinguish between multiple tie breakers.

Examples:

CB-U01-T A tie breaker between SGR-U01 and SGR-U02

CB-P01-T A tie breaker between SGR-P01 and SGR-P02

Figure 6-1 illustrates a sample electrical single line diagram with tie breakers.

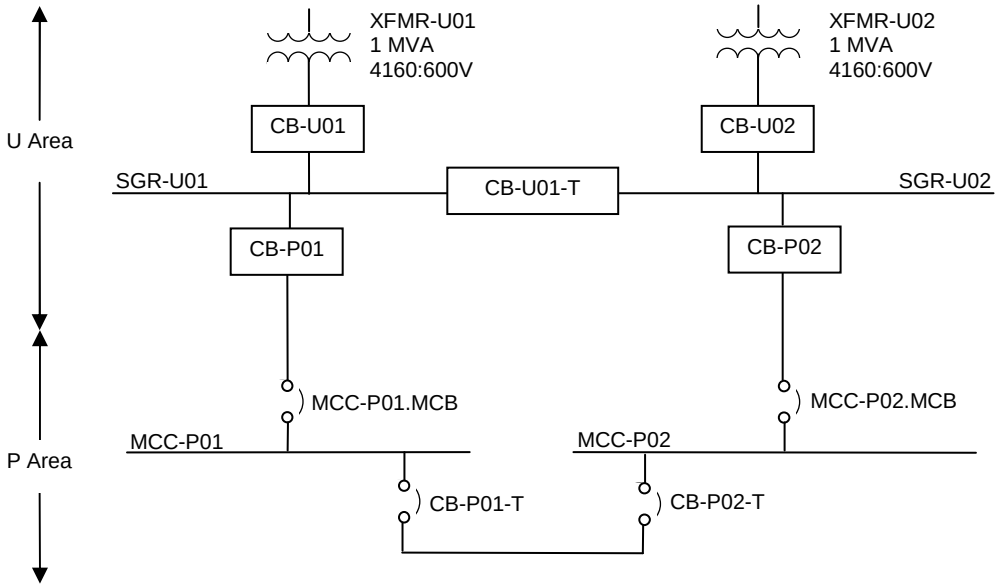


Figure 6-1 : Sample Tie Breaker Identification

6.5 Subcomponents

The following designations are to be utilized for electrical equipment subcomponents. See Section 2.6 for general rules on application of subcomponents. Note that numerous equipment functional designations, shown in Table 6-1, can also be utilized as subcomponent designations, as shown in Table 6-3 below.

Table 6-3 : Electrical Equipment Subcomponents

Subcomponent Designation	Description	Notes
AM	Ammeter	
B	Bus	
CAP	Capacitor	
CON	Contactor	
CPT	Control Power Transformer	
CR	Control Relay	
DS	Disconnect Switch	
F	Fan	
FDS	Fused Disconnect Switch	
FU	Fuse	
M	Motor Contactor	
MCB	Main Circuit Breaker	
MCP	Motor Circuit Protector	
MCS	Moulded Case Switch	
MMC	Motor Management Controller	Also known as intelligent overload.
PM	Power Meter	
PS	Power Supply	
R	Reactor	
RLY	Protection Relay	Utilize IEEE Number for Suffix
SCR	Silicone Controlled Rectifier	
TVSS	Transient Voltage Surge Suppressor	
VM	Voltmeter	

Notes:

1. A motor starter is not typically deemed to be a subcomponent.

Examples:

MS-G261.CAP	A capacitor that is an internal component of MS-G261. If the capacitor were a separate component mounted externally, it would be identified as CAP-G261.
MCC-P11.MCB	Integrated Main Circuit Breaker for Motor Control Centre MCC-P11
MCC-P11.TVSS	Transient Voltage Suppressor integrated into MCC-P11

A sample single line diagram with subcomponents is shown in Figure 6-2. Note that the full identifier is not written out, provided that the parent identifier is clear from the drawing context.

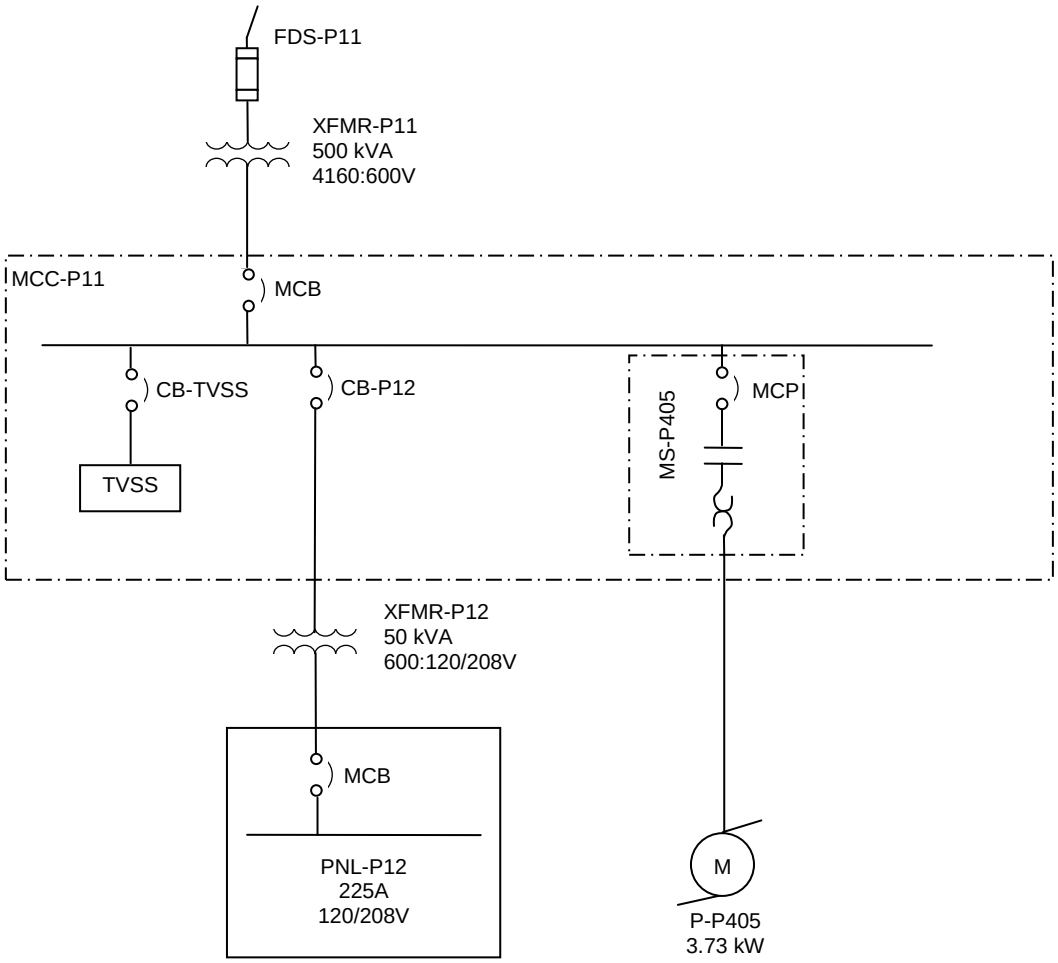


Figure 6-2 : Subcomponents – Electrical Equipment

6.6 Fire Alarm System Devices

6.6.1 Identifier Format

The identification of all fire alarm system components is based upon room numbers rather than equipment numbers. This allows for more rapid recognition of the component location, and avoids utilization of a significant portion of the equipment numbering range for fire alarm system components.

<table>
<tr><th>FFFF</th><th>-</th><th>FAS</th><th>-</th><th>P</th><th>-</th><th>L</th><th>RR</th><th>D</th><th>NN</th></tr>
<tr><td rowspan="2">Facility Code (Optional)</td><td rowspan="2">-</td><td rowspan="2">Fire Alarm Designation</td><td rowspan="2">-</td><td>Process Area</td><td>-</td><td>Level</td><td>Room Number</td><td rowspan="2">Device Designation</td><td rowspan="2">Device Number</td></tr>
<tr><td colspan="4">From Room Number Designation</td></tr>
</table>

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
FAS	is the *Fire Alarm Designation*, which is comprised of the letters FAS.
P	is the *Process Area*, which is based on Section 2.3.
L	is the *Level*, which shall typically be one or two characters, as described in Section 3.2.
RR	is the *Room Number*, which shall be assigned as described in Section 3.2.
D	is the Device Designation, which is comprised of a single letter from Section 6.6.2
NN	is the *Device Number*, which uniquely identifies a specific device within a room.

Examples:

FAS-S-115-D01	The first smoke detector in room 15 on the main level of the Secondary Clarifier process area.
FAS-M-222-A02	The second horn/strobe in room 22 on the second floor of the M process area.

6.6.2 Fire Alarm Device Designations

Table 6-4 : Fire Alarm Device Designations

Device Designation	Description
A	Annunciation Device (Horn / Strobe)
C	Control Relay Module
D	Detection Device (Heat / Smoke)
E	End-of-line Device
I	Isolation Module
M	Addressable Monitor / Input Module
P	Pullstation
R	Automatic Door Release Device
S	Signal Module

6.6.3 Drawing Format

The format of fire alarm system devices on drawings will typically be as shown in Figure 6-3 below. Note a significant portion of the device identifier is determined via context. Where the context is not clear, use full device identifiers.

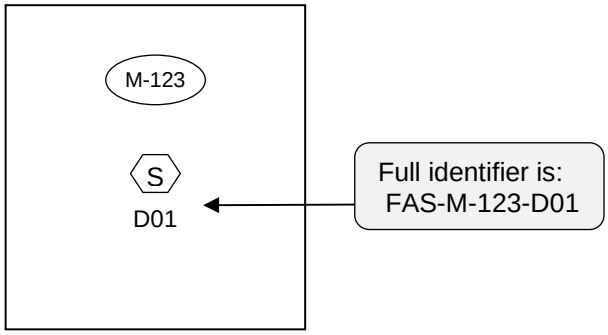


Figure 6-3 : Room Numbering on Drawings – Plan View

6.7 Security Devices

6.7.1 Identifier Format

The identification of all security system components is based upon room numbers rather than equipment numbers. This allows for more rapid recognition of the component location, and avoids utilization of a significant portion of the equipment numbering range for security system components.

<table>
<tr><th>FFFF</th><th>-</th><th>SCY</th><th>-</th><th>P</th><th>-</th><th>L</th><th>RR</th><th>D</th><th>NN</th></tr>
<tr><td rowspan="2">Facility Code (Optional)</td><td rowspan="2">-</td><td rowspan="2">Security Designation</td><td rowspan="2">-</td><td>Process Area</td><td>-</td><td>Level</td><td>Room Number</td><td rowspan="2">Device Designation</td><td rowspan="2">Device Number</td></tr>
<tr><td colspan="4">From Room Number Designation</td></tr>
</table>

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
SCY	is the *Security Designation*, which is comprised of the letters SCY.
P	is the *Process Area*, which is based on Section 2.3.
L	is the *Level*, which shall typically be one or two characters, as described in Section 3.2.
RR	is the *Room Number*, which shall be assigned as described in Section 3.2.
D	is the Device Designation, which is comprised of a single letter from Section 6.7.2.
NN	is the *Device Number*, which uniquely identifies a specific device within a room.

Examples:

SCY-S-115-D01	The first door switch in room 15 on the main level of the Secondary Clarifier process area.
SCY-M-222-A02	The second horn/strobe in room 22 on the second floor of the M process area.
SCY-S-115-R01	The access card reader outside the door to room 15 on the main level of the Secondary Clarifier process area.

6.7.2 Security Device Designations

Table 6-5 : Security Device Designations

Device Designation	Description
A	Annunciation Device (Horn / Strobe)
C	Camera
D	Door Switch
E	End-of-line Device
I	Isolation Module
L	Door Lock
M	Motion Detector
R	Access Card Reader (See Note 1)

Note:

1. Access Card Readers will be designated by the room number that access is being granted to.

7 AUTOMATION

7.1 Instrumentation

7.1.1 Instrument Identifier Format

The identification format for instrumentation is as follows.

<table>
<tr><th>FFFF</th><th>-</th><th>XXXX</th><th>-</th><th>P</th><th>NNN</th><th>T</th><th>-</th><th>S</th></tr>
<tr><td rowspan="2">Facility Code (Optional)</td><td rowspan="2">-</td><td rowspan="2">Instrument Functional Designation</td><td rowspan="2">-</td><td rowspan="2">Process Area</td><td>Equipment Number</td><td>Instrument Number</td><td rowspan="2">-</td><td rowspan="2">Suffix</td></tr>
<tr><td colspan="2">Loop Number</td></tr>
</table>

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
XXXX	is the *Instrument Functional Designation*, which is typically comprised of 2 to 4 characters from Section XX. Note that five character *Instrument Functional Designations* are possible, but should be quite rare.
P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number* of the associated equipment. If no equipment is associated, allocate *Equipment Numbers* specific for the applicable instrumentation. Do not suppress 0's for equipment numbers, as all loop numbers at a site should have the same number of digits in the loop number.
T	is the *Instrument Number*, where the number increments from the number 1 through 9. Use of the number 0 should be infrequent, except for special instruments, or those where the instrument ending with 0 is a common instrument that serves other instruments.
NNNT	is the Loop Number, comprised of the *Equipment Number* together with the *Instrument Number*. Medium to large facilities will utilize four digit loop numbers, while smaller facilities such as wastewater collections facilities will use three digit loop numbers.
S	is the *Suffix*, which is used in the cases of multiple instruments on the same or redundant loops. Utilize numbers for multiple instruments measuring independent items, and letters for redundant instruments.

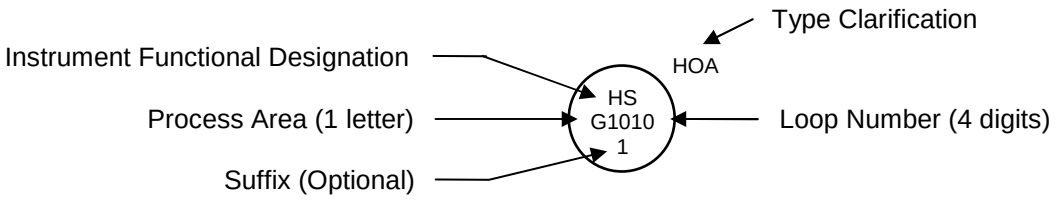
Examples:

XY-G2501	A solenoid for the valve XV-G250, where the solenoid is remote from the valve.
LT-M1011A	Redundant Wet Well level transmitter.
0660-PT-M3011	A pressure transmitter associated with pump M301 at the Hurst Pumping Station. Note that the facility code is optional.
HS-R1102	A start pushbutton associated with pump P-R110.

TY-B1500	A temperature relay that takes signals from TT-B1501, TT-B1502, TT-B1503, and TT-B1504 and converts to a Modbus protocol.
ZSS-F3212	A safety switch for CNV-F321.
HS-L010	A start pushbutton for P-L1 at a wastewater lift station.

7.1.2 Drawing Format

The format for instrumentation on drawings, such as P&IDs, is shown below:



7.1.3 Instrument Functional Designations

An instrument functional designation represents the function of the instrument, and is based upon ISA 5.1. Note that it is possible for an instrument functional designation to be common with a mechanical equipment functional designation, as they will be differentiated by the identifier format. Instrument identifiers will have a four digit loop number, compared with mechanical equipment, which has a three digit equipment number. Thus, even without context, it is possible to differentiate between instruments and other equipment.

Due to the many types of instruments available, a comprehensive list of instrument identifiers is not provided, but rather instrument identifiers are derived from Table 7-1 in a manner that is consistent with ISA 5.1. An instrument functional designation is selected as follows:

- Select the first character from the first column of Table 7-1, based upon the measured or initiating variable of the loop. Optionally, select a second character from the second Modifier column, to indicate a special function associated with the measured or initiating variable. For example, an instrument ultimately part of a safety loop associated with level would have the first two characters designated as LS.
- Select the next character (second or third, depending on whether a second column Modifier is utilized), from either the third or fourth columns. The third column is for Readout or Passive Functions, while the fourth column is for Output Functions.
- Finally, if appropriate, append a letter from the fifth Modifier column, to clarify the function of the instrument. In some cases two characters may be selected from the fifth Modifier column.

A list of common instrument functional designations is provided in Table 7-2.

Table 7-1 : Instrument Functional Designations

	First Letter		Succeeding Letters		
	Measured or Initiating Variable	**Modifier**	**Readout or Passive Function**	**Output Function**	**Modifier**
A	Analysis		Alarm		
B	Burner, Combustion				
C	Conductivity (1)			Control (2)	Close
D	Density (3)	Difference, Differential			Deviation
E	Voltage		Sensor, Primary Element		
F	Flow, Flow Rate	Ratio			
G			Glass, Gauge Viewing Device (4)		
H	Hand (Manual)				High
I	Current		Indicate (5)		
J	Power		Scan		
K	Time, Schedule	Time Rate of Change		Control Station	
L	Level		Light (6)		Low
M	Moisture, Humidity (7)				Middle, Intermediate
N					
O	Torque		Orifice, Restriction		Open
P	Pressure		Point (Test Connection)		
Q	Quantity	Integrate, Totalize	Integrate, Totalize		
R	Radiation		Record		Run (8)
S	Speed, Frequency	Safety (9)		Switch	Stop (10)
T	Temperature			Transmitter	
U	Multivariable		Multifunction	Multifunction	
V	Vibration, Mechanical Analysis			Valve, Damper, Louver	
W	Weight, Force		Well, Probe		
X	Unclassified (11)	X Axis	Unclassified	Unclassified	Unclassified
Y	Event, State, or Presence	Y Axis		Auxiliary Device (12)	
Z	Position, Dimension	Z Axis, Safety Instrumented System (13)		Driver, Actuator, Unclassified Final Control Element	

Notes for Instrument Functional Designations:

1. *The use of the letter C for conductivity is a City specific user assignment.*
2. *Utilize the output designation C for an automatic device or function that receives an input signal and generates a variable output signal that is used to modulate or switch a valve or otherwise control a final drive element. Do not utilize the C designation for a control valve, unless the valve independently measures the process variable and determines the appropriate valve position. Thus, the use of TCV, FCV, or LCV is not common. The use of PCV is more common, for pressure regulators.*
3. *The use of the letter D for density is a City specific user assignment.*
4. *Utilize the letter G for all pressure gauges (i.e. PG), thermometers (i.e. TG), and viewing glasses (e.g. LG).*
5. *The Readout/Passive Function letter I is to be utilized for analog or digital readouts of a measurement or input signal. Do not utilize for indication of discrete on/off signals.*
6. *The Readout/Passive Function letter L is to be utilized for indication of discrete on/off states. No not utilize for alarms, which should utilize the A designation.*
7. *It is recommended to utilize the initial letter M as a designation for moisture, which is common industry practice. The City has historically applied the letter M for Motor, however this use is not consistent with ISA 5.1 and it is recommended that this use be discontinued.*
8. *Utilize the modifier R to designate a Run or Start modifier. Note that this designation was added in the 2009 revision to ISA-5.1, however its use in industry has not yet been well established.*
9. *Utilize the letter S as a modifier for safety components not part of a Safety Instrumented System (SIS). An example is a PSV for a pressure relief valve.*
10. *Utilize the modifier S to designate a Stop modifier. Note that this designation was added in the 2009 revision to ISA-5.1, however its use in industry has not yet been well established.*
11. *The letter X is to be defined at the time of use, and may be used for multiple definitions where no other letter is applicable. The letter X is commonly applied to controlled on-off valves, where the initiating variable is not clearly defined.*
12. *The use of output function Y is to be utilized for a device that connects, disconnects, transfers, computes, and/or converts air, electronic, electric, or hydraulic signals or circuits. Use for a current to pressure signal converter would be appropriate.*
13. *Variable modifier Z is to be utilized for all components of a safety instrumented system (SIS). An example is a SIS system pressure transmitter, designated PZT.*

Table 7-2 : Common Instrument Functional Designations

Designation	Direct Translation	Example
AA	Analysis Alarm	Gas detection horn / strobe
AH	Analysis High Alarm	H_2S gas detection high level alarm
AT	Analysis Transmitter	H_2S gas detection transmitter
DT	Density Transmitter	Density transmitter without local indication
EG	Voltage Viewing Device	Capacitive voltage indicator
EL	Voltage Light	Pilot light indicating voltage is present
EI	Voltage Indicator	Voltage meter with numeric scale, or digital meter
ES	Voltage Switch	General voltage relay
ESL	Voltage Switch - Low	Undervoltage relay
ET	Voltage Transmitter	Voltage transducer
FAL	Flow Alarm - Low	Pilot light indicating low flow
FCV	Flow Control Valve	Integrated valve to limit the flow below a setpoint. The valve is not externally controlled.
FE	Flow Element	Magnetic flowtube, orifice plate
FIT	Flow Indicating Transmitter	Magnetic flowmeter transmitter with local indication
FT	Flow Transmitter	Magnetic flowmeter transmitter without local indication
FV	Flow Valve	Butterfly valve with positioner, modulated by a signal initiated by a flowmeter.
HS	Hand Switch	Start pushbutton or Hand/Off/Remote switch
JIT	Power Indicating Transmitter	Power meter
KS	Time Switch	Timing relay
LSH	Level Switch - High	Sump pit high level switch
LSL	Level Switch - Low	Sump pit low level switch
LE	Level Sensor	Ultrasonic level transducer
LIT	Level Indicating Transmitter	Ultrasonic level transmitter with local indication
LT	Level Transmitter	Ultrasonic level transmitter without local indication
ME	Moisture Sensor	Moisture sensor
OSH	Torque Switch - High	Torque limit switch
PG	Pressure Gauge	Mechanical pressure gauge local to piping
PI	Pressure Indicator	Pressure display remote from piping, with scale.
PSL	Pressure Switch - Low	Low pressure switch on air receiving tank
PSH	Pressure Switch - High	High pressure switch on air receiving tank
PT	Pressure Transmitter	Analog pressure transmitter

ST	Speed Transmitter	Speed pulse encoder
TE	Temperature Element	Thermocouple or RTD temperature sensor
TG	Temperature Gauge	Local temperature gauge
TI	Temperature Indicator	Digital temperature indicator or local analog indicator based upon a capillary tube
TSL	Temperature Switch - Low	Low temperature switch
TSH	Temperature Switch - High	High temperature switch
TT	Temperature Transmitter	Analog temperature transmitter
VE	Vibration Sensor	Vibration sensor
VIT	Vibration Indicating Transmitter	Vibration transmitter with local indication
ZSC	Position - Closed	Valve closed limit switch
ZSO	Position - Open	Valve opened limit switch
ZT	Position Transmitter	Linear position transmitter

7.1.4 Type Clarification

The instrument *Type Clarification* is an optional additional field on the outside of the instrument tag bubble, as shown in Section 7.1.2. The *Type Clarification* is not part of the identifier, but rather additional information that is useful to the P&ID reader.

7.2 Automation Equipment

7.2.1 Identifier Format

The identification format for automation equipment, other than instrumentation, is as follows.

FFFF	**-**	**EEEE**	**-**	**P**	**NNNN**	**-**	**S**
Facility Code (Optional)	-	Equipment Functional Designation	-	Process Area	Equipment Number	-	Suffix (Optional)

Where,

FFFF is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.

EEEE is the *Equipment Functional Designation*, which is comprised of 2 to 4 characters from Section 7.2.2.

P is the *Process Area*, which is based on Section 2.3.

NNNN is the *Equipment Number*. Select numbers consistent with the ranges in Appendix C.

S is the Suffix, an optional numeric or letter code to distinguish between multiple pieces of equipment with a common equipment number. Generally, numbers are utilized for equipment in series, and letters for equipment in parallel.

Examples:

0101-PLC-G901	A PLC located in the Grit process area of the NEWPCC facility.
PLC-G110	A PLC dedicated to pump P-G110.
RIO-G110-1	Remote I/O associated with PLC-G110
JBA-G52	An automation junction box.

7.2.2 Functional Designations

Table 7-3 : Automation Equipment Functional Designations

Functional Designation	Description	Notes
ADP	Automation Device Panel	
CA	Cable (Automation)	
CP	Control Panel	
CS	Computer Server	
CW	Computer Workstation - General	
CWD	Computer Workstation - Development	
CWO	Computer Workstation - Operator	
DCS	Distributed Control System	
FDP	Field Device Panel	Use for new installations should not be common.
GDC	Gas Detection Controller	
HMI	Standalone Human Machine Interface (HMI) Terminal	e.g. local touchscreens
JBA	Junction Box (Automation)	
LCP	Local Control Panel	
PLC	Programmable Logic Controller	
PRN	Printer	
RIO	Remote I/O	
RTU	Remote Terminal Unit	

Notes:

1. *Avoid overlap of Automation Equipment Functional Designations with Electrical, Mechanical, or Process Functional Designations.*

7.3 Automation Cables

7.3.1 Instrumentation Cables

The identification format for automation cables is as follows.

CA	**-**	**P**	**NNNT**	**-**	**S**
Cable Designation	-	Process Area	Loop Number of Instrumentation	-	Suffix (Optional)

Where,

CA is the *Cable Designation*, which for automation cables is comprised of the letters CA.

P is the *Process Area*, which is based on Section 2.3.

NNNT is the *Loop Number* of the associated instrument. Where the cable connects two instrumentation devices with different loop numbers, identify the cable by the device that provides the signal.

S is the *Suffix* utilized to identify the specific cable associated with the loop The Suffix is not required if a single cable is associated with the instrument loop. Utilize sequential numbers for cables in series, or for different purposes, and letters for cables in parallel.

Examples:

CA-G6831 A cable from FSL-G6831 to a control panel.

CA-S5011-1 A signal cable from a flowmeter to a control panel mounted instrument, FC-S5011.

7.3.2 Cables Associated with Identified Equipment

The identification format for automation cables is as follows.

CA	**-**	**P**	**NNN**	**-**	**S**
Cable Designation	-	Process Area	Equipment Number of Associated Equipment	-	Suffix (Optional)

Where,

CA is the *Cable Designation*, which for automation cables is comprised of the letters CA.

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the associated equipment. Where the cable connects two pieces of equipment, identify by the downstream, or serviced piece of equipment.

S is the *Suffix* utilized to identify the specific cable associated with the equipment. The Suffix is not required if a single cable is associated with the equipment. Utilize sequential numbers for cables in series, or for different purposes, and letters for cables in parallel.

Examples:

CA-G683-1 A 120 VAC control cable for pump P-G683.

CA-G6831 A signal cable from a flowmeter associated with pump P-G683.

CA-M0022 A signal cable from a low voltage relay ESL-M0022 within MCC-M02.

7.4 Sample P&ID

A sample pump P&ID is provided below to illustrate typical conventions for identifying instrumentation.

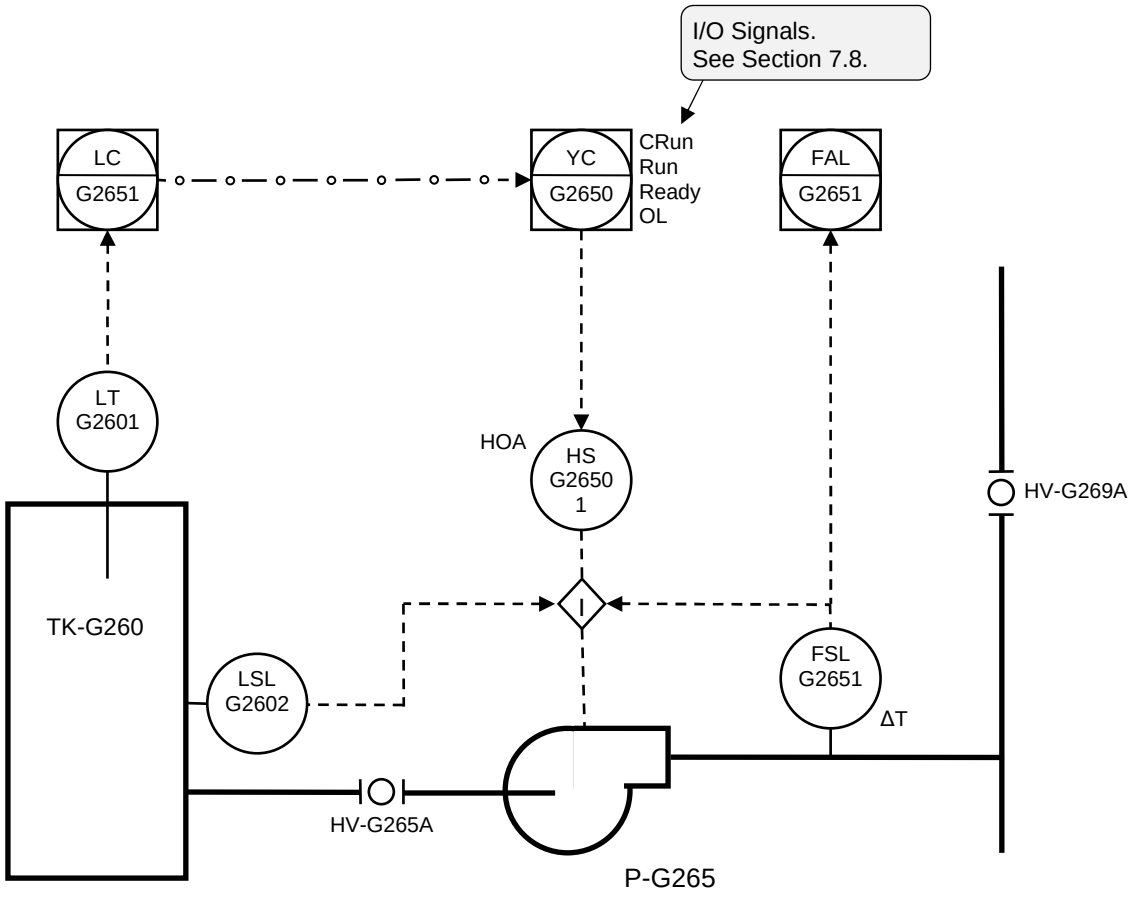


Figure 7-1: Sample Pump P&ID

7.5 Wire Tags

7.5.1 Power Circuits within Control Panels

Power circuits within control panels only require unique identification within the control panel. Where power circuits extend outside the panel, they will typically be based upon the wire tagging scheme identified in Sections 7.5.2 and 7.5.3.

The identification format for power circuits wire tags within control panels is as follows.

D	**W**
Power Designation	Wire Number

Where,

D is the *Power Designation*, which is based upon Table 7-4.

W is the *Wire Number*, an incrementing number.

Table 7-4 : Wire Tag Power Designations

Power Designation	Description
C	DC Common (0V)
G	Ground
L	AC Power (Hot)
N	AC Neutral
P	DC Positive
NEG	DC Negative (not grounded)

Note: The Ground designation is not typically required, provided that the ground wire is green.

Examples:

L1 Main 120VAC circuit within a control panel.

L11 120VAC sub-circuit, after fuse F11.

N1 AC Neutral associated with circuit L1.

P22 24VDC circuit

C1 24VDC common wire (0V)

7.5.2 Control Circuits

The identification format for automation control circuits is as follows:

P	NNN	T	-	W	S
Process Area	Equipment Number	Instrument Number	-	Wire Number	Suffix (Optional)
	Loop Number				

Where,

P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number* of the associated equipment. If no equipment is associated, allocate *Equipment Numbers* specific for the applicable instrumentation.
T	is the *Instrument Number*, where the number increments from the number 1 through 9. Use of the number 0 should be infrequent, except for special instruments, or those where the instrument ending with 0 is a common instrument that serves other instruments.
NNNT	is the Loop Number, comprised of the *Equipment Number* together with the *Instrument Number*.
W	is the *Wire Number*, which is typically an incrementing number. For power wires the *Wire Number* shall be based on Table 7-4.
S	is an optional *Suffix*, and is utilized where it is desired to utilize the same wire number, but the signal has changed.

Notes:

1. It is not required that the Wire Number match the control panel terminal number.

2. See Section 6.4.5.4 regarding wire numbering for motor control circuits.

Examples:

G6521-11	Control wire 11 associated with TSH-G6521.
G6521-11A	Control wire 11A associated with TSH-G6521.
G6522-P	24VDC Power wire for FT-G6522.
G6522-C	24VDC Common wire for FT-G6522.

7.5.3 Analog Signal Circuits - Instruments

The identification format for analog signal circuits associated with instruments is as follows:

P	**NNN**	**T**	**-**	**W**	**A**
Process Area	Equipment Number	Instrument Number	-	Wire Number (Optional)	Analog Designation
	Loop Number				

Where,

P is the *Process Area*, which is based on Section 2.3.

NNNT is the Loop Number, comprised of the *Equipment Number* together with the *Instrument Number*.

W is the *Wire Number*, an incrementing number. The wire number may optionally be omitted for two wire control.

A is the Analog Designation, which is typically either "+" or "–". For power wires the designation shall be based on Table 7-4.

Notes:

1. *It is not required that the Wire Number match the control panel terminal number.*
2. *For two-wire signals, use "+" and "-" designations. Do not utilize a power designation "-P" for two wire signals.*

Examples:

G6523+ Signal wire + associated with TT-G6523.

G6523- Signal wire - associated with TT-G6523.

M4215-1+ Signal wire 1+ associated with FT-M4215

M4215-P 24VDC power wire associated with FT-M4215 (Four wire signal).

7.5.4 I/O Wiring

I/O wiring within a control panel is designated by the I/O address rather than the connected instrument. This allows for a more straightforward control panel layout, and avoids relabeling internal panel wiring upon reallocation of I/O. The identification format for I/O wiring in a control panel is as follows:

DD	**R**	**.**	**M**	**.**	**N**	**A**
I/O Designation	Rack Number (Optional)		Module Number (Optional)		I/O Number	Analog Designation (Optional)

Where,

DD is the *I/O Designation*, which is based on Table.

R is the *Rack Number*, which is typically one or two digits. A Rack Number is not applicable to all I/O systems.

W is the *Module Number*, which is typically one or two digits. A *Module Number* is not applicable to all I/O systems.

A is the Analog Designation, if applicable, and typically is either “+” or “–“..

Table 7-5 : I/O Designations

Power Designation	**Description**
AI	Analog Input
AQ	Analog Output
I	Discrete Input (AC or DC)
Q	Discrete Output (AC or DC)

Notes:

1. *The I/O Wiring Designation is to be utilized within a control panel only. Utilize wire designations based upon Sections 7.5.2 and 7.5.3 for wiring outside the control panel.*
2. *It is acceptable for a wire on one side of a terminal to be designated by an I/O designation and to have an alternate identifier for the wire on the other side of the terminal.*

Examples:

AI1.0.1+ Analog input + wire associated with rack 1, module 0, point 1.

AQ5.3- Analog output – wire associated with module 5, point 3. The rack number is not applicable.

I52 Discrete input 52. The rack number and module number are not applicable.

I5.3.31 Discrete input associated with rack 5, module 3, point 31.

Q2.1.5 Discrete output associated with rack 2, module 1, point 5.

7.6 Subcomponents

As described in Section 2.6, devices that are an inherent component of a larger unit of equipment or instrumentation are designated as subcomponents. With a strict implementation of ISA 5.1, these subcomponents would potentially be given full identifiers. However, in assigning full identifiers for these signals, the relationship between the subcomponent and its parent piece of equipment is not always clear. Additionally, more identifiers are used as a result of having to assign an identifier to each subcomponent. A good example of instrumentation subcomponents is a valve with limit switches. The limit switches are typically deemed to be a subcomponent of the valve.

As described in Section 2.6, subcomponents can be identified by extending the containing equipment name with a suffix. The parent equipment identifier and suffix are to be separated by a period. This system creates a hierarchy, allowing for rapid identification of subcomponents and reduces programming efforts when integrating these signals into an automation system.

A good example for a mechanical piece of equipment that contains subcomponents is a valve actuator with integrated open and closed limit switches. The limit switches would not typically be labelled separately in the field, as there is no specific discrete equipment to attach the label to, other than the valve actuator as a whole. The suffix would be based upon the subcomponent's functional identification. For example:

A P&ID example with a subcomponent is shown in Figure 7-2. Note that the subcomponents of the valve are the limit switches, identified as follows.

XV-G381.ZSO The open limit switch of the valve XV-G381

XV-G381.ZSC The closed limit switch of the valve XV-G381

It should be noted that the closed limit switch, XV-G381.ZSC, is not shown on the drawing as it is implied, as the signal ZSC is shown next to the XC-G6811 block, indicating that there is a closed limit switch input signal.

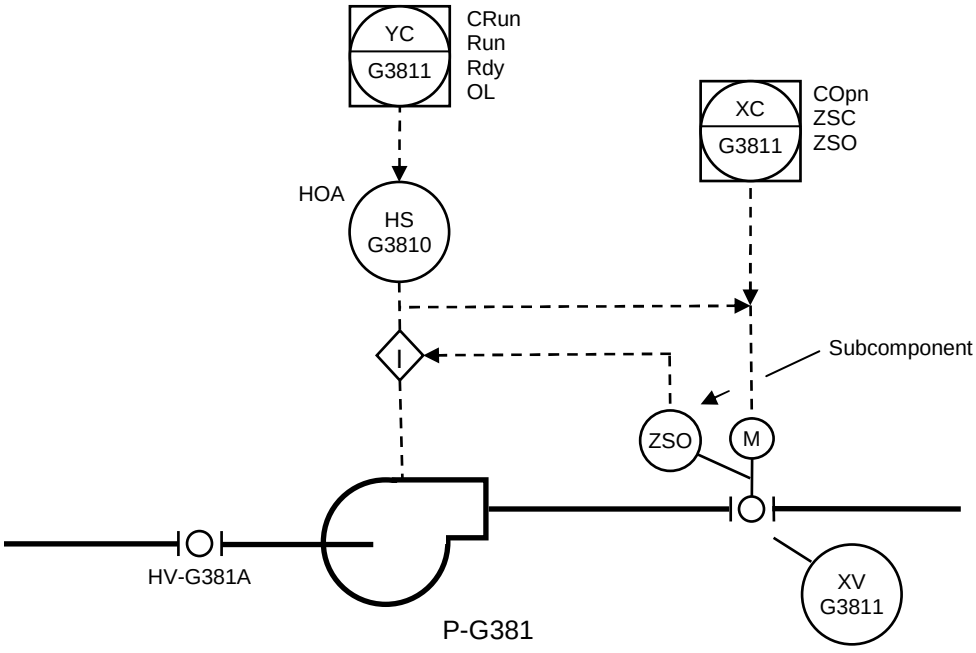


Figure 7-2 : Subcomponents – Mechanical and Process Equipment

7.7 Software Configuration File Naming

Where software to configure automation equipment does not include integral version management, software configuration file names shall be composed as follows.

FFFF		**E***		**YYYY**	**MM**	**DD**	**-**	**X**
Facility Code (Optional)	-	Equipment Identifier	-	Year	Month	Day	-	Revision Modifier (Optional)
				Date				

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be included in the filename where required.
E*	is the unique *Equipment Identifier*, as identified by other sections of this document.
YYYYMMDD	is the date of the last edit.
X	is the *Revision Modifier*, which a letter beginning with A, B, C…. used to indicate intra-day revisions.

Examples:

PLC-G250-20120819	A PLC program for PLC-G250 last edited on August 19, 2012.
LT-M1011-20120501-B	A configuration file for level transmitter LT-M1011, dated May 1, 2012, second revision.
NSW-C901-20121231	A network switch configuration file dated December 31, 2012.

7.8 I/O and Signal Tags

7.8.1 Discrete Signals

Identification of discrete control system software I/O and signal tags will be as follows:

E*	.	Cmd	F	_	S
Equipment Identifier	.	Output Designation	Functional Signal Designation		Suffix (Optional)

Where,

E* is the *Equipment Identifier*, based upon other parts of this document.

Cmd Is the *Output Designation*, utilized to identify outputs. It is only utilized for output signals. Note that no designation is utilized for input signals.

F is the *Functional Signal Designation*, which represents the type of discrete signal. The *Functional Signal Designation* shall be based on Table 7-6. Note that many discrete signals are not based upon an ISA-5.1 style naming convention, as ISA-5.1 does not address many discrete signal identification scenarios.

S is the *Suffix*, which can be any short designation appropriate to represent the specific signal. Ideally the suffix will be four characters or less. The Suffix is separated from the *Functional Signal Identification* by an underscore.

Examples:

VFD-G101.Flt	VFD fault signal for pump P-G101.
AHU-M602.CmdRun	Motor run output signal for AHU-M602.
AHU-M602.Run	Run signal for AHU-M602.
FT-S6021.Flt	Fault signal associated with flow transmitter FT-S6021.
G6021.CmdYL_1	“Do Not Enter” Pilot Light output signal.

Table 7-6 : Discrete Functional Signal Designations

Signal	Type	Description
.CmdRun	DO	Run Command
.CmdRst	DO	Fault Reset Command
.CmdCls	DO	Close Command
.CmdOpn	DO	Open Command
.CmdEnb	DO	Enable Command
.CmdFA	DO	An output signal to drive a flow alarm pilot light.
.CmdYL	DO	An output to drive a state pilot light.
.ESL	DI	A power fail input signal

.Flt	DI	Faulted
.FSL	DI	A signal from a low flow switch.
.HS_Auto	DI	Hand Switch Auto Position
.HS_Byp	DI	Hand Switch Bypass Position
.HS_Loc	DI	Hand Switch Local Position
.HS_Man	DI	Hand Switch Manual Position
.HS_Occ	DI	Hand Switch Occupied Position
.HS_Off	DI	Hand Switch Off Position
.HS_Rem	DI	Hand Switch Remote Position
.HS_Rst	DI	Hand Switch Reset Pushbutton
.HS_Start	DI	Hand Switch Start Pushbutton
.HS_Stop	DI	Hand Switch Start Pushbutton
.HSS	DI	Hand Safety Switch (E-Stop) depressed
.Rdy	DI	VFD / Motor Starter Ready
.Run	DI	Motor Running
.TSL	DI	Temperature Switch Low
.TSH	DI	Temperature Switch High
.ZSC	DI	Position Switch Closed (e.g. Damper)
.ZSO	DI	Position Switch Closed (e.g. Damper)
.ZSM	DI	Position Switch Intermediate (e.g. Damper)

Notes:

1. *The above list is not exhaustive, and the designer is expected to follow a similar convention to the above when assigning new signal names. Commonly used signal names should be added to the table.*
2. *ISA 5.1 style designations are to utilize capital letters only. Non ISA-5.1 designations are to use a first capital letter, followed by lowercase letters.*
3. *A combination of ISA and non-ISA designations is permissible, provided they are connected via an underscore. For example: HS_Rem represents a hand switch remote position.*
4. *All discrete outputs are to be prefixed with the Cmd designation.*

7.8.2 Analog Signals Generated From Equipment

Identification of analog control system software I/O and signal tags, where the source of the signal is not identified as an instrument, will be as follows:

E*	**.**	**F**	**_**	**S**
Equipment Identifier	.	Functional Variable		Suffix (Optional)

Where,

E* is the *Equipment Identifier*, based upon other parts of this document.

F is the *Functional Variable*, which represents the type of analog signal. This field is only required for multivariable transmitters. The *Functional Variable* shall be based on the first column of Table 7-1, with an optional character from the second column. Note that the *Functional Variable* is based upon ISA 5.1.

S is the optional *Suffix*, which can be any short designation appropriate to represent the specific signal. Ideally the suffix will be four characters or less. The *Suffix* is separated from the Functional Variable by an underscore.

Note:

1. Do not use this format for analog signals from identified instruments. Refer to Section 7.8.3.

Examples:

UPS-G702.E_Bat	UPS–G702 Battery Voltage Level
UPS-G702.E_In	UPS–G702 Input Voltage Level
UPS-G702.E_Out	UPS–G702 Output Voltage Level
VFD-G101.T	VFD-G101 internal temperature.
CB-M01.RLY.E_An	The voltage signal between phase A and neutral for the protection relay associated with circuit breaker CB-M01.
MS-S501.I_A	The phase A current associated with motor starter MS-S501.

7.8.3 Analog Measured Signals Generated From Instruments

Identification of analog control system software I/O and signal tags, where the source of the signal is an instrument, will be as follows:

I*	**.**	**F**	**_**	**S**
Instrument Identifier	.	Functional Variable (Optional)		Suffix (Optional)

Where,

I* is the *Instrument Identifier*, based upon other parts of this document.

F is the *Functional Variable*, which represents the type of analog signal. This field is only required for multivariable transmitters. The *Functional Variable* shall be based on the first column of Table 7-1, with an optional character from the second column. Note that the *Functional Variable* is based upon ISA 5.1.

S is the optional *Suffix*, which can be any short designation appropriate to represent the specific signal. Ideally the suffix will be four characters or less. The *Suffix* is separated from the *Functional Variable* via an underscore.

Examples:

MT-G6231	Moisture signal of MT-G6231
FT-S5122.P	Pressure signal of multivariable transmitter FT-S5122.
FT-S5122.F	Flow signal of multivariable transmitter FT-S5122.
FT-S5122.T	Temperature signal of multivariable transmitter FT-S5122.
FV-G6821.Z	Position of damper FV-G6821.
PDT-G4231.P_1	High side pressure of differential pressure transmitter PDT-G4231.
PDT-G4231.P_2	Low side pressure of differential pressure transmitter PDT-G4231.
PDT-G4231.PD	Differential pressure of differential pressure transmitter PDT-G4231.
TT-M613	TT-M613 temperature signal

7.8.4 Analog Output Signals

Identification of analog control system software I/O and signal tags, where the source of the signal is a controller such as a PLC, will be as follows:

I*	**.**	**Cmd**	**F**	**-**	**S**
Instrument Identifier	.	Output Designation	Functional Variable	-	Suffix (Optional)

Where,

I* is the *Instrument Identifier*, based upon other parts of this document.

F is the *Functional Variable*, which represents the type of analog signal. The *Functional Variable* shall be based on the first column of Table 7-1, with an optional character from the second column. Note that the *Functional Variable* is based upon ISA 5.1.

Cmd Is the *Output Designation*, utilized to identify outputs.

S is the optional *Suffix*, which can be any short designation appropriate to represent the specific signal. Ideally the suffix will be four characters or less. The *Suffix* is separated from the *Functional Variable* via an underscore.

Examples:

FV-M215.CmdZ	Valve position command signal.
P-M210.CmdS	Pump speed command signal.
BLR-B610.CmdT	Boiler temperature command signal.
TV-G6822.CmdZ	Temperature valve position command signal.

7.8.5 Control System Software Implementation.

Where a control system software implementation does not support the use of the “.” Character used in the signal identification, it is recommended to replace the period “.” character with an underscore (“_”). For example:

P-G101.Flt would become P-G101_Flt

8 COMMUNICATION EQUIPMENT

8.1 Identifier Format

The identification format for communication equipment, is as follows.

FFFF	**-**	**EEEE**	**-**	**P**	**NNN**	**-**	**S**
Facility Code (Optional)	-	Equipment Functional Designation	-	Process Area	Equipment Number	-	Suffix (Optional)

Where,

FFFF	is the *Facility Code*, from Appendix A. The *Facility Code* will typically be implied, and would only be fully written where required.
EEEE	is the *Equipment Functional Designation*, which is comprised of 2 to 4 characters from Section 8.2.
P	is the *Process Area*, which is based on Section 2.3.
NNN	is the *Equipment Number*. Select numbers consistent with the ranges in Appendix C.
S	is the Suffix, an optional numeric or letter code to distinguish between multiple pieces of equipment with a common equipment number. Generally, numbers are utilized for equipment in series, and letters for equipment in parallel.

Examples:

NSW-G901	An Ethernet switch located in the G process area.
JBN-G110	A networking junction box associated with pump P-G110.
NJ-G901-1	A networking jack associated with NSW-G901.

8.2 Functional Designations

Table 8-1 : Communication Equipment Functional Designations

Functional Designation	Description	Notes
ANT	Antenna	
CN	Network Cable	
JBN	Junction Box - Network	
MDM	Modem	
NAP	Network Access Point	
NFW	Network Firewall	
NGW	Network Gateway	
NJ	Network Jack	
NJT	Network Jack – Telephone	
NMC	Network Media Converter	
NP	Networking Panel	
NRA	Network Radio	
NRT	Network Router	
NSW	Network Switch, Ethernet	

Notes:

1. *Avoid overlap of Communication Equipment Functional Designations with Electrical, Mechanical, and Automation Functional Designations*

8.3 Network Cables

The identification format for network cables is as follows.

CN	-	P	NNN	-	S
Cable Designation	-	Process Area	Equipment Number of Associated Equipment	-	Suffix (Optional)

Where,

CN is the *Cable Designation*, which for network cables is comprised of the letters CN.

P is the *Process Area*, which is based on Section 2.3.

NNN is the *Equipment Number* of the associated equipment. Where the cable connects two pieces of equipment, identify by the downstream, or serviced piece of equipment.

S is the *Suffix* utilized to identify the specific cable associated with the equipment. The Suffix is not required if a single cable is associated with the equipment. Utilize sequential numbers for cables in series, or for different purposes, and letters for cables in parallel. Utilize the letter T to designate tie connections.

Examples:

CN-G901-1 An uplink network cable for NSW-G901.

CN-M2531 A network cable that connects level transmitter LT-M2531.

CN-M801 A network cable that connects PLC-M801 to NSW-M910.

Appendix A Facility Codes

Facility Code	Facility
0001 - 0099	**Unused – Future**
0100 - 0109	**Wastewater Treatment Facilities**
0101	North End Water Pollution Control Centre (NEWPCC)
0102	South End Water Pollution Control Centre (SEWPCC)
0103	West End Water Pollution Control Centre (WEWPCC)
0110 - 0399	**Collections Facilities – Wastewater and Flood Pumping Stations**
0111	Perimeter Road Pumping Station - Wastewater
0112	Alexander Pumping Station - Wastewater
0113	Armstrong - Pumping Station - Wastewater
0114	Ash - Pumping Station - Flood / Wastewater
0115	Assiniboine - Pumping Station - Flood
0116	Aubrey - Pumping Station - Flood / Wastewater
0117	Baltimore - Pumping Station - Flood / Wastewater
0118	Bannatyne - Pumping Station - Flood
0119	Barker - Pumping Station - Wastewater
0120	Bournais / Mission Gard - Pumping Station - Wastewater
0121	Burrows - Pumping Station - Wastewater
0122	Camiel - Pumping Station - Wastewater
0123	Chataway - Pumping Station - Wastewater
0124	Clarence - Pumping Station - Wastewater
0125	Clifton - Pumping Station - Flood / Wastewater
0126	Cloutier - Pumping Station - Wastewater
0127	Cockburn - Pumping Station - Flood / Wastewater
0128	Colony - Pumping Station - Flood
0129	Colony - Pumping Station - Wastewater
0130	Community - Pumping Station - Wastewater
0131	Conway / Moorgate - Pumping Station - Wastewater
0132	Cornish - Pumping Station - Flood
0133	Cornish - Pumping Station - Wastewater
0134	Crane - Pumping Station - Wastewater
0135	Darcy - Pumping Station - Wastewater
0136	Despins - Pumping Station - Flood / Wastewater
0137	Dublin - Pumping Station - Wastewater
0138	Dugald - Pumping Station - Wastewater
0139	Dumoulin - Pumping Station - Flood / Wastewater

Facility Code	Facility
0140	Elmhurst - Pumping Station - Wastewater
0141	Ferry Road - Pumping Station - Wastewater
0142	Galt Pumping Station - Flood
0143	Grandmont - Pumping Station - Wastewater
0144	Hart - Pumping Station - Flood / Wastewater
0145	Hawthorne - Pumping Station - Flood / Wastewater
0146	Heritage - Pumping Station - Wastewater
0147	Holland - Pumping Station - Wastewater
0148	Jefferson - Pumping Station - Flood / Wastewater
0149	Jessie - Pumping Station - Flood / Wastewater
0150	Kilkenny - Pumping Station - Flood
0151	Kilkenny - Pumping Station - Wastewater
0152	King Edward - Pumping Station - Wastewater
0153	Larchdale - Pumping Station - Wastewater
0154	Laverendrye - Pumping Station - Flood
0155	Linden - Pumping Station - Flood / Wastewater
0156	Louelda - Pumping Station - Wastewater
0157	Mager Dr - Pumping Station – Flood / Wastewater
0158	Manitoba - Pumping Station - Wastewater
0159	Marion - Pumping Station - Flood / Wastewater
0160	Mayfair Pumping Station - Flood / Wastewater
0161	Metcalfe - Pumping Station - Flood
0162	Metcalfe - Pumping Station - Wastewater
0163	Mission Pumping Station - Flood
0164	Montcalm - Pumping Station - Wastewater
0165	Munroe - Pumping Station - Wastewater
0166	Newton - Pumping Station - Flood / Wastewater
0167	Notre Dame - Pumping Station - Wastewater
0168	Oakgrove - Pumping Station - Wastewater
0169	Olive - Pumping Station - Wastewater
0170	Pandora - Pumping Station - Wastewater
0171	Parklane - Pumping Station - Wastewater
0172	Parkwood - Pumping Station - Wastewater
0173	Polson - Pumping Station - Flood / Wastewater
0174	Portsmouth - Pumping Station - Wastewater
0175	Pulberry - Pumping Station - Wastewater
0176	Ravelston – Pumping Station – Land Drainage
0177	Ridgedale - Pumping Station - Wastewater

Facility Code	Facility
0178	Riverbend - Pumping Station - Wastewater
0179	Roland - Pumping Station - Flood
0180	Ryan - Pumping Station - Wastewater
0181	Selkirk - Pumping Station - Flood / Wastewater
0182	Somerville - Pumping Station - Wastewater
0183	Sommerville / Willow - Pumping Station - Wastewater
0184	St. Charles - Pumping Station - Wastewater
0185	St. Johns - Pumping Station - Flood
0186	St. Norbert - Pumping Station - Flood
0187	St. Norbert - Pumping Station - Wastewater
0188	Strathmillan - Pumping Station - Wastewater
0189	Syndicate - Pumping Station - Flood / Wastewater
0190	Thibault - Pumping Station - Wastewater
0191	Trappiste - Pumping Station - Wastewater
0192	Tuxedo - Pumping Station - Wastewater
0193	Tylehurst - Pumping Station - Wastewater
0194	Westwood - Pumping Station - Wastewater
0195	Wexford - Pumping Station - Wastewater
0196	Willow - Pumping Station - Wastewater
0197	Windsor Park - Pumping Station - Wastewater
0198	Woodhaven - Pumping Station - Wastewater
0400 - 0599	**Unused - Future**
0600 - 0799	**Water System Facilities**
0600	Shoal Lake Intake
0601	Water Treatment Plant
0620	Deacon Booster Pumping Station (May be part of the Water Treatment Plant ... City to confirm)
0630	MacLean Water Pumping Station
0640	McPhillips Water Pumping Station
0650	Hurst Water Pumping Station
0660	Taché Booster Pumping Station
0800 - 0999	**Unused - Future**

Appendix B Master Equipment Functional Designations

Functional Designation	Description	Type	Notes
AD	Air Dryer	Mechanical	
ADP	Automation Device Panel	Automation	
AF	Aeration Fan	Mechanical	
AG	Agitator	Mechanical	
AHU	Air Handling Unit	Mechanical	Includes Make-Up Air Units
ANT	Antenna	Communication	
ATS	Automatic Transfer Switch	Electrical	
B	Blower	Mechanical	
BAT	Battery	Electrical	
BC	Battery Charger	Electrical	
BD	Balance Damper	Mechanical	See Section 4.3.
BFP	Back Flow Preventer	Mechanical	
BLR	Boiler	Mechanical	
BS	Bar Screen	Mechanical	
BWY	Busway	Electrical	
C	Cable (Power)	Electrical	
CA	Cable (Automation)	Automation	
CAP	Capacitor	Electrical	Typically individual unit. See PFC.
CB	Circuit Breaker	Electrical	Includes air, vacuum, SF6, and moulded case circuit breakers
CBUS	Cable Bus	Electrical	
CC	Cooling Coil	Mechanical	
CDR	Condensor	Mechanical	
CE	Centrifuge	Mechanical	
CHLR	Chiller	Mechanical	
CL	Clarifier	Mechanical	Includes Primary and Secondary Clarifiers
CM	Clarifier Mechanism	Mechanical	
CMP	Compressor	Mechanical	
CN	Network Cable	Communication	
CNV	Conveyor	Mechanical	Includes skimmers
CON	Contactor	Electrical	
CP	Control Panel	Electrical	
CP	Control Panel	Automation	
CPR	Cathodic Protection Rectifier	Electrical	

Functional Designation	Description	Type	Notes
CRN	Crane	Mechanical	
CS	Computer Server	Automation	
CT	Cooling Tower	Mechanical	
CU	Condensing Unit	Mechanical	
CV	Check Valve	Mechanical	
CW	Computer Workstation - General	Automation	
CWD	Computer Workstation - Development	Automation	
CWO	Computer Workstation - Operator	Automation	
DCS	Distributed Control System	Automation	
DP	Distribution Panel	Electrical	
DS	Disconnect Switch (non-fusible)	Electrical	
EF	Exhaust Fan	Mechanical	
F	Fan - General	Mechanical	
FA	Flame Arrestor	Mechanical	
FAAP	Fire Alarm Annnunciator Panel	Electrical	
FACP	Fire Alarm Control Panel	Electrical	
FAS	Fire Alarm System	Electrical	
FC	Fan Coil	Mechanical	
FD	Fire Damper	Mechanical	Utilize same equipment number as air handler.
FDP	Field Device Panel	Automation	
FDR	Feeder	Mechanical	Examples: screw feeder, chlorinator, glycol make-up unit
FDS	Fusible Disconnect Switch	Electrical	
FEX	Fire Extinguisher	Mechanical	
FG	Flap Gate	Mechanical	
FIL	Filter	Mechanical	
FU	Fuse	Electrical	
GDC	Gas Detection Controller	Automation	
GEN	Generator	Electrical	
GR	Grille – General	Mechanical	See Section 4.3.
GRD	Grille – Diffuser	Mechanical	See Section 4.3.
H	Heater	Mechanical	General Heaters, Radiant Heaters, etc.
HB	Heater - Baseboard	Mechanical	

Functional Designation	Description	Type	Notes
HC	Heating Coil	Mechanical	
HCE	Heating Coil, Electric	Mechanical	
HCP	Heater Contactor / Control Panel	Electrical	
HE	Heat Exchanger	Mechanical	
HF	Harmonic Filter	Electrical	
HMI	Standalone Human Machine Interface (HMI) Terminal	Automation	
HO	Hoist	Mechanical	
HOP	Hopper	Mechanical	
HP	Heat Pump	Mechanical	
HRC	Heat Recovery Coil	Mechanical	
HV	Hand/Manual Valve	Mechanical	See Section 5.2
JB	Junction Box	Electrical	
JBA	Junction Box (Automation)	Automation	
JBN	Junction Box - Network	Communication	
K	Interlocking Key (Kirk Key)	Electrical	
LC	Lighting Contactor	Electrical	
LCP	Local Control Panel	Automation	
MCC	Motor Control Centre	Electrical	
MCP	Motor Circuit Protector	Electrical	
MCS	Moulded Case Switch	Electrical	
MDM	Modem	Communication	
MMS	Manual Motor Starter	Electrical	
MS	Motor Starter	Electrical	
MSP	Motor Starter Panel	Electrical	
MTR	Motor	Electrical	
MTS	Manual Transfer Switch	Electrical	
MXR	Mixer	Mechanical	
NAP	Network Access Point (Wireless)	Communication	
NFW	Network Firewall	Communication	
NGR	Neutral Grounding Resistor	Electrical	
NGW	Network Gateway	Communication	
NJ	Network Jack	Communication	
NJT	Network Jack - Telephone	Communication	
NMC	Network Media Converter	Communication	
NP	Networking Panel	Communication	

Functional Designation	Description	Type	Notes
NRA	Network Radio	Communication	
NRT	Network Router	Communication	
NSW	Network Switch, Ethernet	Communication	
OD	Overhead Door	Mechanical	
P	Pump	Mechanical	
PB	Pull Box	Electrical	
PFC	Power Factor Correction Unit	Electrical	Bank of capacitors. May contain reactors.
PLC	Programmable Logic Controller	Automation	
PM	Power Meter	Electrical	
PNL	Panelboard	Electrical	
PRN	Printer	Automation	
PS	Power Supply	Electrical	24VDC power supply, or fire alarm booster power supply.
R	Reactor (various processes)	Mechanical	
RCPT	Receptacle	Electrical	
RCTR	Reactor	Electrical	
RES	Reservoir	Mechanical	Large water containment structure.
RIO	Remote I/O	Automation	
RTU	Remote Terminal Unit	Automation	
S	Skid Package	Mechanical	
SA	Sampler	Mechanical	
SCBR	Scrubber	Mechanical	
SCR	Silicon Controlled Rectifier	Electrical	
SF	Supply Fan	Mechanical	
SGR	Switchgear	Electrical	
SL	Stop Logs	Mechanical	
SLG	Sluice Gate	Mechanical	
SPL	Splitter	Electrical	
SS	Soft Starter	Electrical	
STR	Strainer	Mechanical	See Section 5.2
SW	Switch	Electrical	
TBC	Travelling Bridge Collector	Mechanical	
TK	Tank	Mechanical	
TU	Terminal Unit	Mechanical	Includes CAV/VAV/Dual Duct boxes. Dampers to be identified as per Section 7.1 – Instrumentation.

Functional Designation	Description	Type	Notes
TVSS	Transient Voltage Surge Suppressor	Electrical	
U	Miscellaneous Equipment Not In List	Mechanical	Example: Water Softener
UH	Unit Heater	Mechanical	
UPS	Uninterruptible Power Supply	Electrical	
UVR	Ultra-Violet (UV) Reactor	Mechanical	
V	Vessel, Pressure Vessel	Mechanical	e.g. air receiver, glycol expansion tank
VFD	Variable Frequency Drive	Electrical	
W	Weir	Mechanical	
WGB	Waste Gas Burner	Mechanical	
XFMR	Transformer	Electrical	

Appendix C Equipment Number Ranges

Equipment Number Ranges – Water Treatment Plant

Process Area	Range	Description
C – Chemical Feed	01 – 99	Reserved for Electrical Equipment (See Section 6)
	001 - 099	Process – Polymer
	100 – 899	Process – Future
	800 – 999	Chemical Systems
	900 – 949	Chemical Systems – Hydrogen Peroxide
	950 – 979	Chemical Systems – Sodium Bisulphate
D - Deacon Booster Pumping Station	001 - 599	Process
	600 – 699	HVAC
	700 – 999	Confirm
F - Filtration	001 – 999	Process
H – Plant Utilities	001 - 099	HVAC
	100 - 199	Fire Pumps
	200 - 299	Auxiliary Building HVAC
	300 - 399	Building Safety and Security
	400 - 499	Process Pumps
	500 - 599	Sanitary Sumps
	600 - 699	Electrical Distribution
	700 - 799	Potable Water
	800 - 899	Unallocated
	900 - 950	Emergency Generator
	951 - 999	Electrical Substation
I – Inlet and Raw Water	001 - 999	Process
J – On-Site Hypochlorite Generation	001 - 999	Process
L – Freeze Thaw Pond	001 - 999	Process
O - Ozone	001 - 999	Process
P – Flocculation and DAF	001 - 999	Process
R – Residuals Handling	001 - 999	Process
S – Bulk Chemical Storage	001 - 999	Process
T – Treated Water Storage and Handling (Clearwell)	001 - 999	Process
U – Ultraviolet Light Disinfection	001 - 999	Process

Process Area	Range	Description
Y – Yard Piping and Valve Chambers	001 - 099	Surge Towers
	100 - 199	Yard Piping
	200 - 299	Yard Lighting

Note: The above WTP process ranges are largely based upon existing designations. In the event of future significant upgrades, some realignment may be required to fully align with this standard.

Equipment Number Ranges – Collections Facilities

Process Area	Range	Description
L – Wastewater Lift Stations or F – Flood Pumping Station or U – Underpass Pumping Station	01 – 49	Reserved for Process Equipment
	01 - 09	Pumps
	10 – 19	Wet Well / Intake Equipment
	20 - 39	Misc Process
	40 - 49	Discharge / Forcemain
	50 - 59	Misc Building Equipment – Air Compressors, Backflow Preventer, etc.
	60 - 69	HVAC Equipment
	70 - 79	Electrical Equipment
	80 – 89	Automation Equipment
	90 - 99	Misc, including communication and security
S – Sewer	01 – 79	Sewer – Misc.
	80 - 89	Sewer – Before Outfall
	90 - 99	Sewer - Outfall

Note: The Collections facilities utilize two digit equipment numbers due to the limited amount of equipment located within each facility. Instrumentation loop numbers within Collections facilities have three digits.

Equipment Number Ranges – Wastewater Treatment Facilities

Process Area	Range	Description
All Process Areas	001 - 099	Electrical Equipment
	100 – 499	Process Equipment
	500 – 599	Misc Building Equipment – Air Compressors, Backflow Preventer, etc.
	600 - 699	HVAC Equipment
	700 - 799	Future
	800 – 899	Automation Equipment
	900 – 999	Misc, including communication and security